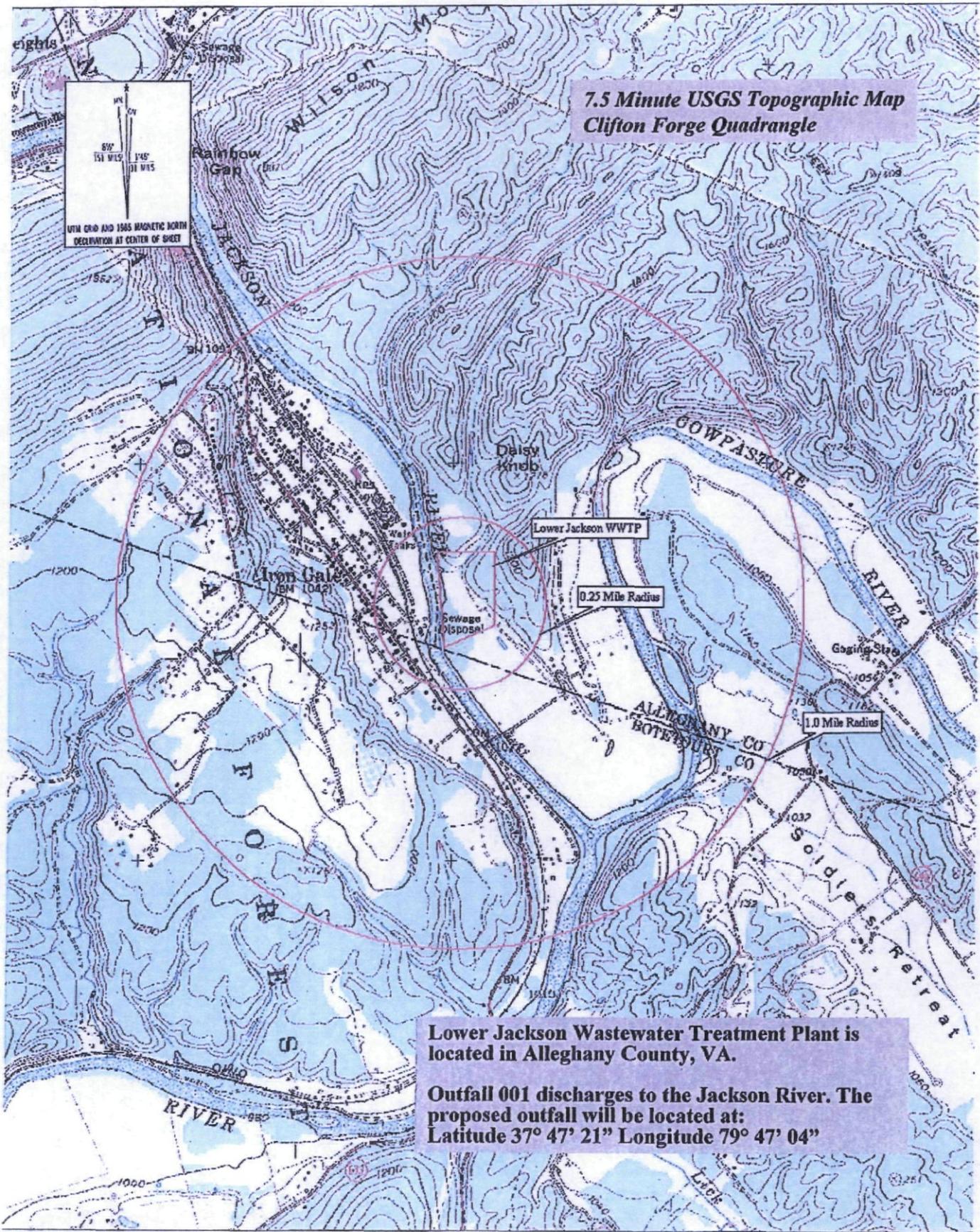


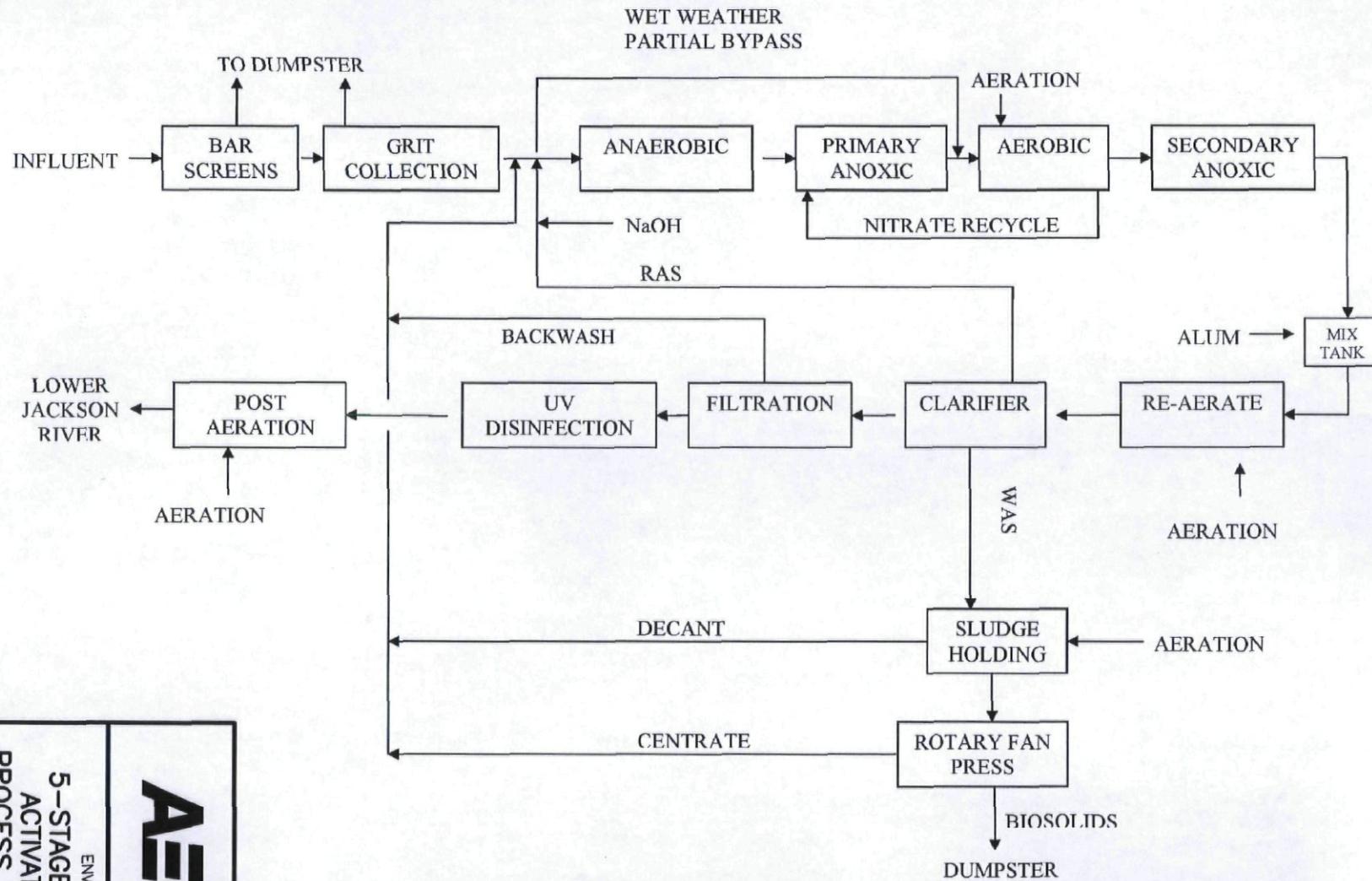
APPENDIX A

Facility Information



Attachment One

ATTACHMENT #2



LOWER JACKSON RIVER REGIONAL WWTP - 2.6 MGD

AECOM

ENVIRONMENTAL

5-STAGE BARDENPHO
ACTIVATED SLUDGE
PROCESS FLOW DIAGRAM

MARCH 2011

60186P

FIG.5

ALLEGHANY COUNTY, VIRGINIA

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Site Visit, Lower Jackson River Regional WWTP, Alleghany County

TO: File

FROM: Lewis Pillis

DATE: April 22, 2011

COPIES:

Today, Christopher Clark, Alleghany County Public Works Director, and Brian White, of ESS, accompanied me on a brief tour of the site. All buildings are under roof and the major treatment units have been constructed. One of the bioreactor basins was full of water for testing. Construction is expected to be complete by the end of summer.

ESC measures have been installed, but a lot of the storm water is ponding on the site. A storm water outlet to the River is present about 200 feet upstream of outfall 001. Some of the inlets were observed. Contributions to the outlet are 1) off site storm water, 2) a grated inlet adjacent to the solids handling building and 3) a grade inlet south of the clarifiers and west of the UV area. Off-site storm water empties into earthen ditches on the east, west and south sides of the WWTP and reenters the storm drain in a manhole south of the plant before being discharged. The site has not been brought to final grade, so it was not possible to determine flow directions on the site.

Both the effluent and storm water outfalls appeared to be constructed according to DCR specs, with the outlets at grade and the ditches protected with riprap.

Effluent will enter the River just upstream of a riffle area. The pool behind the riffle area is small and the river is moving fairly rapidly in this area. At the Rt. 727 bridge, small rocks line the River bottom and the rocks appear to have a brown coating on them.

APPENDIX B

Receiving Stream Information

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Flow Frequency Determination, Lower Jackson River STP,
VPDES Permit No. VA0090671

TO: File

FROM: Lewis Pillis *ZP*

DATE: March 6, 2006

COPIES:

Critical flows for the gages used in preparing the referenced permit have changed since development of the last permit. Eugene Powell, DEQ-Office of Surface Water Investigations, updated the gage statistics in 2005. Critical flows for the Jackson and James River gages includes flows released from Gathright dam in these calculations. Using the same method that was employed in the issuance of the subject permit, flows from the Cowpasture River near Clifton Forge (# 02016000), were subtracted from flows of the James River at Lick Run (# 02016500), which is about 4 miles downstream of the discharge point. Drainage area proportions were then used to project critical flows at the discharge point. Since the Clifton Forge STP will simultaneously go offline when discharge from the Lower Jackson River STP begins, this flow is also subtracted from the critical river flow. The attached spreadsheet details these calculations.

Critical flows at the discharge point once the Clifton Forge STP goes offline are:

1Q10 – 119 MGD
7Q10 – 129 MGD
30Q10 – 141 MGD
30Q5 – 156 MGD
HF 1Q10 – 154 MGD
HF 7Q10 – 191 MGD
HF 30Q10 – 226 MGD
Harmonic Mean – 353 MGD

High Flow Months – JAN - MAY
Period Used – 1980– 2003

QUAD	REGION	DAAREA	HARMEAN	HF30Q10			HF7Q10		HF1Q10		Z30Q5		Z30Q10		Z7Q10		Z1Q10		Z1Q30	
				cfs																
02016500	James River at Lick Run, Va.	Clifton Forge	WCRO	1373	745	479	393	325	315	286	261	242	200							
02016000	Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO	461	191	124	92	82	69	63	56	53	47							
	James River at Lick Run, Va. MINUS Cowpasture River			912	554	355	301	243	246	223	205	189	153							
James River	at outfall for Lower Jackson River STP	Drainage area proportions	904.5/912 0.991776	549	352	299	241	244	221	203	187	152								
		convert to MGD:																		
James River at Lick Run, Va.	Clifton Forge	WCRO		481	310	254	210	204	185	169	156	129								
Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO		123	80	59	53	45	41	36.2	34.3	30.4								
Less Clifton Forge STP contribution				355	228	193	156	158	143	131	121	98								
Final critical flows at Lower Jackson STP				2	2	2	2	2	2	2	2	2								
				353	226	191	154	156	141	129	119	96								

mix 2_6 MGD.txt

Mixing Zone Predictions for

Lower Jackson 2.6 MGD

Effluent Flow = 2.6 MGD
Stream 7Q10 = 129 MGD
Stream 30Q10 = 141 MGD
Stream 1Q10 = 119 MGD
Stream slope = 0.0016 ft/ft
Stream width = 148 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7662 ft
Length = 12816.15 ft
Velocity = .7793 ft/sec
Residence Time = .1903 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.8619 ft
Length = 12254.82 ft
Velocity = .8066 ft/sec
Residence Time = .1758 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.6837 ft
Length = 13347.09 ft
Velocity = .7554 ft/sec
Residence Time = 4.908 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.37% of the 1Q10 is used.

virginia DEQ Mixing Zone Analysis Version 2.1

Mixing Zone Predictions for

Lower Jackson River WWTP

Effluent Flow = 3.5 MGD

Stream 7Q10 = 129 MGD

Stream 30Q10 = 226 MGD

Stream 1Q10 = 119 MGD

Stream slope = .0016 ft/ft

Stream width = 148 ft

Bottom scale = 3

Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7735 ft

Length = 12771.32 ft

Velocity = .7814 ft/sec

Residence Time = .1892 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 2.475 ft

Length = 9614.88 ft

Velocity = .9699 ft/sec

Residence Time = .1147 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.6912 ft

Length = 13296.84 ft

Velocity = .7576 ft/sec

Residence Time = 4.8753 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.51% of the 1Q10 is used.

Dischargers and Sampling Stations on the Jackson - James River

Diurnal 2006 DEQ

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	model mile	model mile
APXB station	One Mile below McClintic - Sta. No. 4			A	2-JKS053.48-TL			53.48	
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-BL			48.90	
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-TL			48.90	
APXB station	WQS - Lake Moomaw (Lower Lake)			C	2-JKS047.06			47.06	
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-BL			46.40	
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-TL			46.40	
APXB station	Dam - Station No. 1			A	2-JKS044.60-BL			44.60	
APXB station	Dam - Station No. 1			A	2-JKS044.60-TL			44.60	
APXB station	Below Gathwright Dam at gage			A	2-JKS044.10			44.10	
U.S. Army Corps of Engineers	Morris Hill STP	005	001	0.01500	Sewage	JKS		43.55	
APXB station	Near Camp Appalachia			B	2-JKS039.01			39.01	
Sponaugle, Frank	Sponaugle Subd.	005	001	0.01600	Sewage	JKS		34.93	
APXB station	Rt. 687 Bridge - Clearwater Park			A,B,SS	2-JKS030.65			30.65	
APXB station	Covington Water Filtration Plant			SS1, SS2	2-JKS026.01			26.01	
Covington, City of	Jackson R. WTP		001	4.0000	Intake	Jackson R.		26.00	
WESTVACO	WESTVACO		002		Intake	Jackson R.		25.88	
WESTVACO	WESTVACO		003		Intake	Jackson R.		25.56	
WESTVACO	WESTVACO		004		Intake	Jackson R.		25.52	
WESTVACO	WESTVACO	005	007		Storm Water	JKS		25.44	
WESTVACO	WESTVACO	005	005		Storm Water	JKS		25.36	
WESTVACO	WESTVACO	005	006		Storm Water	JKS		25.20	
WESTVACO	WESTVACO		005		Intake	Jackson R.		25.09	
WESTVACO	WESTVACO		006		Intake	Jackson R.		25.08	
Martin County Coal Corporation	Coal Handling Facility	005	006	0.00000	Storm Water	JKS		24.96	
WESTVACO	WESTVACO	005	001	33.00000	Storm Water	JKS		24.92	
WESTVACO	WESTVACO	005	008	0.00000	Storm Water	JKS		24.84	
WESTVACO	WESTVACO		007		Intake	Jackson R.		24.80	
WESTVACO	WESTVACO		008		Intake	Jackson R.		24.69	
WESTVACO	WESTVACO	005	002	23.20000	Storm Water	JKS		24.68	
WESTVACO	WESTVACO	005	003	27.60000	Process	JKS		24.64	
WESTVACO	WESTVACO	005	009	0.00000	Storm Water	JKS		24.52	
WESTVACO	WESTVACO	005	010	0.00000	Storm Water	JKS		24.48	
WESTVACO	WESTVACO	005	011	0.00000	Storm Water	JKS		24.47	
WESTVACO	WESTVACO	005	012	0.00000	Storm Water	JKS		24.26	
WESTVACO	WESTVACO	005	013	0.00000	Storm Water	JKS		24.25	
APXB station	Rt. 60 Bridge			SS	2-JKS024.20			24.20	
APXB station	City Park - Covington at gage			A,B	2-JKS023.61			23.61	
APXB station	City Park - Covington at gage			SS	2-JKS023.61			23.61	
APXB station	Swinging Bridge			SS	2-JKS023.32			23.32	
APXB station	Fudge's Bridge, Rt. 154, Covington			SS	2-JKS022.78			22.78	
APXB station	Industrial Park behind Walmart			SS1, SS2	2-JKS022.15			22.15	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	004		Storm Water	JKS		21.07	
APXB station	S. Rayon Dr. Bridge, Covington			SS	2-JKS021.06			21.06	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	002	0.60000	Fire Water Storage Tanks	JKS		19.72	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	001	0.90000	Process	JKS		19.22	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	003	0.00000	Storm Water	JKS		19.22	
Covington, City of	Covington STP	580	001	3.00000	Sewage	JKS		19.03	
APXB station	Rt. 18 Bridge at Covington			A,B,SS	2-JKS018.68			18.68	
APXB station	Byrd's Farm East of Covington			SS	2-JKS017.30			17.30	
APXB station	Byrd's Farm #2			SS	2-JKS017.03			17.03	
APXB station	Between I-64 & CSX Railroad N/Mallow			SS	2-JKS015.80			15.80	

Dischargers and Sampling Stations on the Jackson - James River

Diurnal 2006 DEQ

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	model mile	model mile
APXB station	Island Ford Cave above Low Moor			SS	2-JKS013.45		13.45		
APXB station	Off Rt. 696 above Lowmoor			A,B	2-JKS013.29		13.29		
APXB station	Island Ford Bridge, Rt. 1101			SS	2-JKS011.92		11.92		
Alleghany County	Low Moor STP	005	001		0.5 Sewage	JKS	10.05		
APXB station	Low Water Bridge - near Dabney Lancaster			A,B	2-JKS006.67		6.67	0	
CSX Transportation, Inc.	Clifton Forge	560	001	0.05470	Process	JKS	4.72	1.95	
Clifton Forge, City of	Clifton Forge STP	560	001	2.00000	Sewage	JKS	3.46	3.21	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	002	0.32300	Cooling-Contact	JKS	1.21	5.46	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	001	0.02300	Process	JKS	1.17	5.50	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	999	0.02300	Process	JKS	1.17	5.50	
Alleghany Co.	Proposed Lower Jackson river STP				Sewage		0.76	5.91	0
APXB station	Rt. 727 Bridge - near Iron Gate			A	2-JKS000.38		0.38	6.29	0.38
Confluence of Cowpasture and Jackson						JMS	346.49	6.67	0.76
APXB station	Rt. 220 Bridge - near Gage			B	2-JMS345.73		345.73	7.43	1.52
Botetourt County	Glen Wilton STP	023	001	0.02000	Sewage	JMS	342.85	10.31	4.40
APXB station	James R. at Salisbury			A,B	2-JMS326.30		326.30	26.86	20.95
Botetourt County	Buchanan STP	023	001	0.23750	Sewage	JMS	308.51	44.65	38.74
APXB station	Rt. 501 Bridge - S.E. of Glasgow			A	2-JMS282.28		282.28	70.88	64.97
Georgia Pacific Co	GP, Big Island Plant	019	021	0.00600	Storm Water - Unloading Area	JMS	278.89	74.27	68.36

Stream Data

Station_2-JKS000.38

Station_Description = RT. 727 IRON GATE

Collection_Date_Time	Field pH	DO Probe	Temp Celsuis	Specific Conductance	NH3+NH4-N TOTAL MG/L	Code	NO2-N TOTAL MG/L	Code	NO3-N TOTAL MG/L	Code	TOT KJEL N MG/L	Code	TOTAL N MG/L	Code
1	1/13/1999 10:40	7.79	12	5.4	370	0.04 U	0.01 U		0.17 --		1 --			
2	2/8/1999 11:10	7.7	11.7	8.4	290	0.04 U	0.01 U		0.19 --		0.4 --			
3	3/18/1999 9:55	7.94	11.1	8.7	110	0.04 U	0.01 U		0.23 --		1.1 --			
4	4/7/1999 10:25	8.64	10.4	15.3	328	0.04 U	0.01 U		0.04 U		0.2 --			
5	5/3/1999 12:30	8.04	10.1	16.6	375	0.04 --	0.01 U		0.09 --		0.6 --			
6	6/23/1999 10:30	8.24	8.3	21.4	700	0.04 U	0.02 --		0.04 U		0.6 --			
7	7/28/1999 11:00	8.1	7.4	25.7	575	0.04 U	0.01 U		0.04 U		0.7 --			
8	8/30/1999 11:35	8.16	8.2	22	600	0.04 U	0.01 U		0.04 U		0.6 --			
9	9/28/1999 11:05	7.71	7.5	19.8	405	0.04 U	0.01 U		0.04 U		1.1 --			
10	10/22/1999 11:10	8.48	11.8	10.9	550	0.04 U	0.01 U		0.04 U		0.3 --			
11	12/9/1999 11:00	8.3	12.7	7.2	442	0.06 --	0.01 U		0.05 --		0.4 --			
12	1/13/2000 10:30	7.61	12.1	7	280	0.04 U	0.01 U		0.07 --		0.4 --			
13	2/24/2000 10:55	7.7	12.5	8.4	212	0.04 U	0.01 --		0.27 --		0.2 --			
14	3/28/2000 10:25	7.37	11.1	9.5	205	0.04 U	0.01 U		0.16 --		0.4 --			
15	4/19/2000 11:30	7.33	10.4	12	110	0.04 U	0.01 U		0.16 --		0.4 --			
16	5/15/2000 11:50	8.22	9.2	20	600	0.04 U	0.01 U		0.06 --		0.3 --			
17	6/1/2000 12:15	7.93	9.4	19.7	278	0.04 U	0.01 --		0.05 --		0.5 --			
18	7/10/2000 12:20	8.26	9.1	25.9	700	0.04 U	0.01 U		0.09 --		0.4 --			
19	8/1/2000 14:05	8.38	8.5	24	445	0.04 U	0.04 --		0.33 --		0.4 --			
20	9/7/2000 12:45	8.12	8.9	18.5	398	0.04 U	0.01 --		0.24 --		0.3 --			
21	10/4/2000 13:00	8.24	9	20.6	878	0.04 U	0.01 U		0.04 U		0.3 --			
22	12/6/2000 13:30	8.73	14	3.5	565	0.04 U	0.01 U		0.04 --		0.2 --			
23	1/16/2001 10:40	8.43	12.9	6.7	570	0.04 U	0.01 --		0.19 --		0.5 --			
24	2/1/2001 9:30	8.48	11.8	6.7	513	0.04 U	0.01 --		0.19 --		0.3 --			
25	3/1/2001 13:00	8.95	13.7	8.9	252	0.04 U	0.03 --		0.04 U		0.3 --			
26	3/1/2001 13:00	8.95	13.7	8.9	252	0.04 U	0.03 --		0.04 U		0.3 --			
27	4/2/2001 10:00	9.5	11.8	8.1	142	0.04 U	0.01 U		0.26 --		0.1 U			
28	5/1/2001 15:30	8.67	10.38	20.3	561	0.04 U	0.01 --		0.05 --		0.4 --			
29	6/5/2001 9:30	7.87	8.68	18.8	350	0.04 U	0.01 --		0.14 --		0.4 --			
30	7/19/2001 13:40	8.24	8.14	24.1	520	0.04 U	0.01 U		0.07 --		0.4 --			
31	8/16/2001 14:30	8.27	8.91	23.7	482.3	0.04 U	0.01 U		0.08 --		0.4 --			
32	9/10/2001 14:30	8.54	7.89	24	600	0.04 U	0.01 U		0.04 U		0.4 --			
33	10/10/2001 13:15	8.6	9.73	14.8	811	0.04 U	0.01 --		0.05 --		0.2 --			
34	11/28/2001 13:30	8.44	10.53	15	600	0.04 U	0.01 --		0.13 --		0.4 --			
35	12/18/2001 9:50	7.73	10.31	10.5	675	0.04 U	0.01 --		0.19 --		0.2 --			
36	1/22/2002 13:50	8.9	15.08	7.1	499	0.04 U	0.01 U		0.04 U		0.2 --			
37	2/19/2002 12:45	8.9	14.09	7.2	500	0.04 U	0.01 U		0.04 U		0.3 --			
38	3/26/2002 10:15	7.52	9.22	11.56	482.9	0.04 U	0.01 U		0.16 --		0.3 --			
39	4/17/2002 10:20	7.71	8.15	20.78	283.6	0.04 U	0.01 --		0.13 --		0.5 --			
40	5/23/2002 10:20	8.2	10.88	15.52	494.5	0.04 U	0.01 --		0.07 --		0.3 --			
41	6/17/2002 10:30	7.97	8.44	21.5	566.3	0.04 U	0.01 --		0.09 --		0.4 --			
42	7/18/2002 10:00	7.84	6.94	24.77	667.6	0.04 U	0.01 --		0.07 --		0.4 --			
43	8/7/2002 10:20	7.81	7.6	23.82	701.6	0.04 U	0.01 --		0.15 --		0.5 --			
44	9/17/2002 10:50	8.17	7.17	22.81	746.2	0.05 --	0.03 --		0.48 --		0.6 --			
45	10/21/2002 11:20	7.9	8.53	15.09	730.8	0.04 U	0.01 --		0.12 --		0.3 --			
46	11/18/2002 10:20	8.51	10.6	9.1	202.6	0.04 U	0.01 U		0.32 --		0.3 --			
47	12/16/2002 11:40	7.69	11.23	7.06	101.7	0.04 U	0.01 U		0.26 --		0.2 --			
48	2/3/2003 14:30	8.81	13.92	7.3	634	0.04 U	0.01 U		0.09 --		0.4 --			
49	3/3/2003 12:30	7.93	11.8	8.29	170.6	0.04 U	0.01 U		0.31 --		0.1 --			
50	3/25/2003 14:00	8.43	11.42	12.37	237.7	0.04 U	0.01 U		0.2 --		0.2 --			
51	5/1/2003 15:30	8.48	11.01	18.35	319.6	0.04 U	0.01 U		0.11 --		0.2 --			
52	6/19/2003 9:55	7.3	9.29	16.68	170.1	0.05 --	0.01 U		0.26 --		0.2 --			

Stream Data

Station_2-JKS000.38

Station_Description = RT. 727 IRON GATE

Collection_Date_Time	Field pH	DO Probe	Temp Celsuis	Specific Conductance	NH3+NH4-N TOTAL		NO2-N TOTAL		NO3-N TOTAL		TOT KJEL N		TOTAL N	
					MG/L	Code	MG/L	Code	MG/L	Code	MG/L	Code	MG/L	Code
53	7/17/2003 14:10	8.15	8.04	24.2	298.8								0.67	--
54	9/29/2003 13:25	7.87	10.64	16.08	269.5								0.48	--
55	11/18/2003 13:20	7.67	8.3	12.54	273.6								0.43	--
56	1/13/2004 10:40	7.46	11.28	5.03	352.3								0.34	--
57	3/8/2004 14:20	8.7	10.1	7.5	238.7								0.44	--
58	5/20/2004 10:55	7.88	9.16	16.97	287.5								0.55	--
59	7/7/2004 12:10	7.97	6.81	24.1	525.8								0.54	--
60	9/23/2004 9:45	7.47	9.37	18.03	449								0.38	--
61	11/17/2004 14:20	8.25	8.58	11.25	342.7								0.36	--
62	1/5/2005 11:30	7.74	10.39	12.34	270.1								0.41	--
63	3/29/2005 13:30	8.06	10.95	10.42	103.3								0.6	--
64	5/2/2005 11:00	8.08	10.04	12.24	184								0.35	--
65	7/12/2005 11:00	7.9	7.9	23.4	467								0.31	--
66	9/28/2005 11:00	8.25	9.7	20.5	655								0.5	--

U = Material Analyzed for, but not detected. Value stored is the limit of detection.

Stream Data 2-JKS006.67

LOW WATER BR NEAR DABNEY LANCASTER COMM.

Collection	Percent_Fl	Depth	Field_pH	DO_Probe	Temp_Celsuis	Specific_Conductance	BOD - 5 Day	Comment
							mg/L	
1/13/1999	30	0.3	7.62	10.9	5.8	400		4 --
2/8/1999	30	0.3	8.11	10.4	8.5	312		3 --
3/18/1999	30	0.3	8.04	11.1	8.2	110		3 --
4/7/1999	30	0.3	8.15	8.8	15.4	360		3 --
5/3/1999	30	0.3	8.1	9.4	16.8	400		3 --
6/23/1999	30	0.3	8	7	21	700		2 U
7/28/1999	30	0.3	7.79	6.1	24.4	600		4 --
8/30/1999	30	0.3	7.96	7.3	21.2	625		2 U
9/28/1999	30	0.3	7.75	7.3	18.8	330		3 --
12/9/1999	30	0.3	8.07	11	7.5	550		2 U
1/13/2000	30	0.3	7.39	11.2	7.2	310		2 U
2/24/2000	30	0.3	7.66	12	8.5	235		2 U
3/28/2000	30	0.3	7.39	11	9.8	220		2 --
4/19/2000	30	0.3	7.31	10	11.8	112		2 --
5/15/2000	30	0.3	7.98	8.5	19.1	700		3 --
6/1/2000	30	0.3	7.71	8.6	19.4	340		2 --
7/10/2000	30	0.3	7.96	7.8	25.4	720		2 --
8/1/2000	30	0.3	8.53	9	24.5	590		3 --
9/7/2000	30	0.3	8.01	8.1	18.2	450		2 U
9/7/2000	30	0.3	8.01	8.1	18.2	450		2 U
10/4/2000	30	0.3	7.9	8.2	20.3	902		2 U
11/2/2000	30	0.3	8.59	10.5	13	880		-- O
12/6/2000	30	0.3	8.51	14	4	568		2 U
1/9/2001	30	0.3	8.41	12.5	4.1	551		2 U
2/1/2001	30	0.3	7.99	12.3	6	537		2 U
3/1/2001	30	0.3	9.05	12.1	7.5	260		2 U
4/2/2001	30	0.3	8.64	11.8	7.7	159		2 U
5/1/2001	30	0.3	8.89	10.34	21.1	565		3 --
5/1/2001	30	0.3	8.89	10.34	21.1	565		3 --
6/5/2001	30	0.3	8.09	8.51	20	400		2 U

U = Material Analyzed for, but not detected. Value stored is the limit of detection.

Station_ID
Station_Description

2-JKS000.38
RT. 727 IRON GATE

Gage: 02016000

Collection_Date_Time	Field_pH	Temp_Celsuis	Specific Conductance	TOTAL HARDNESS
				CaCO3 mg/L
3/18/1999 9:55	7.94	8.7	110	64
4/7/1999 10:25	8.64	15.3	328	116
5/3/1999 12:30	8.04	16.6	375	106
6/23/1999 10:30	8.24	21.4	700	184
7/28/1999 11:00	8.1	25.7	575	152
8/30/1999 11:35	8.16	22	600	183
9/28/1999 11:05	7.71	19.8	405	129
12/9/1999 11:00	8.3	7.2	442	191
1/13/2000 10:30	7.61	7	280	129
2/24/2000 10:55	7.7	8.4	212	87
3/28/2000 10:25	7.37	9.5	205	90
4/19/2000 11:30	7.33	12	110	50
5/15/2000 11:50	8.22	20	600	166
6/1/2000 12:15	7.93	19.7	278	94
7/10/2000 12:20	8.26	25.9	700	165
8/1/2000 14:05	8.38	24	445	124
9/7/2000 12:45	8.12	18.5	398	114
10/4/2000 13:00	8.24	20.6	878	137
11/2/2000 15:10	8.71	12.2	820	215
12/6/2000 13:30	8.73	3.5	565	224
1/16/2001 10:40	8.43	6.7	570	233
2/1/2001 9:30	8.48	6.7	513	124
3/1/2001 13:00	8.95	8.9	252	80.1
3/1/2001 13:00	8.95	8.9	252	79.9
4/2/2001 10:00	9.5	8.1	142	29.2
5/1/2001 15:30	8.67	20.3	561	144
6/5/2001 9:30	7.87	18.8	350	119
7/19/2001 13:40	8.24	24.1	520	138
8/16/2001 14:30	8.27	23.7	482.3	90.3
9/10/2001 14:30	8.54	24	600	200
10/10/2001 13:15	8.6	14.8	811	209
11/28/2001 13:30	8.44	15	600	182
12/18/2001 9:50	7.73	10.5	675	159
1/22/2002 13:50	8.9	7.1	499	217
2/19/2002 12:45	8.9	7.2	500	205
3/26/2002 10:15	7.52	11.56	482.9	143
4/17/2002 10:20	7.71	20.78	283.6	104
5/23/2002 10:20	8.2	15.52	494.5	144
6/17/2002 10:30	7.97	21.5	566.3	163
7/18/2002 10:00	7.84	24.77	667.6	171
8/7/2002 10:20	7.81	23.82	701.6	182
9/17/2002 10:50	8.17	22.81	746.2	191
10/21/2002 11:20	7.9	15.09	730.8	195
11/18/2002 10:20	8.51	9.1	202.6	68.4
12/16/2002 11:40	7.69	7.06	101.7	63.6
2/3/2003 14:30	8.81	7.3	634	175
3/3/2003 12:30	7.93	8.29	170.6	61.3
3/25/2003 14:00	8.43	12.37	237.7	45.9
5/1/2003 15:30	8.48	18.35	319.6	98.1
6/19/2003 9:55	7.3	16.68	170.1	56.9
AVERAGE	8.21	15.16	457.26	135.8

Station_ID 2-JKS000.38 Gage: 02016000
Station_Description RT. 727 IRON GATE

field Temperature data
over the period,
1/13/1999-6/192003

1	12/6/2000	3.5
2	1/13/1999	5.4
3	1/16/2001	6.7
4	2/1/2001	6.7
5	1/13/2000	7
6	12/16/2002	7.06
7	1/22/2002	7.1
8	12/9/1999	7.2
9	2/19/2002	7.2
10	2/3/2003	7.3
11	4/2/2001	8.1
12	3/3/2003	8.29
13	2/8/1999	8.4
14	2/24/2000	8.4
15	3/18/1999	8.7
16	3/1/2001	8.9
17	3/1/2001	8.9
18	11/18/2002	9.1
19	3/28/2000	9.5
20	12/18/2001	10.5
21	3/26/2002	11.56
22	4/19/2000	12
23	11/2/2000	12.2
24	3/25/2003	12.37
25	10/10/2001	14.8
26	11/28/2001	15
27	10/21/2002	15.09
28	4/7/1999	15.3
29	5/23/2002	15.52
30	5/3/1999	16.6
31	6/19/2003	16.68
32	5/1/2003	18.35
33	9/7/2000	18.5
34	6/5/2001	18.8
35	6/1/2000	19.7
36	9/28/1999	19.8
37	5/15/2000	20
38	5/1/2001	20.3
39	10/4/2000	20.6
40	4/17/2002	20.78
41	6/23/1999	21.4
42	6/17/2002	21.5
43	8/30/1999	22
44	9/17/2002	22.81
45	8/16/2001	23.7
46	8/7/2002	23.82
47	8/1/2000	24
48	9/10/2001	24
49	7/19/2001	24.1
50	7/18/2002	24.77
51	7/28/1999	25.7
52	7/10/2000	25.9

90% = 46.8

Station_ID
Station_Description

2-JKS000.38
RT. 727 IRON GATE

Gage: 02016000

field pH data over the
period, 1/13/1999-
6/19/2003

1	6/19/2003	7.3
2	4/19/2000	7.33
3	3/28/2000	7.37
4	3/26/2002	7.52
5	1/13/2000	7.61
6	12/16/2002	7.69
7	2/8/1999	7.7
8	2/24/2000	7.7
9	9/28/1999	7.71
10	4/17/2002	7.71
11	12/18/2001	7.73
12	1/13/1999	7.79
13	8/7/2002	7.81
14	7/18/2002	7.84
15	6/5/2001	7.87
16	10/21/2002	7.9
17	6/1/2000	7.93
18	3/3/2003	7.93
19	3/18/1999	7.94
20	6/17/2002	7.97
21	5/3/1999	8.04
22	7/28/1999	8.1
23	9/7/2000	8.12
24	8/30/1999	8.16
25	9/17/2002	8.17
26	5/23/2002	8.2
27	5/15/2000	8.22
28	6/23/1999	8.24
29	10/4/2000	8.24
30	7/19/2001	8.24
31	7/10/2000	8.26
32	8/16/2001	8.27
33	12/9/1999	8.3
34	8/1/2000	8.38
35	1/16/2001	8.43
36	3/25/2003	8.43
37	11/28/2001	8.44
38	2/1/2001	8.48
39	5/1/2003	8.48
40	11/18/2002	8.51
41	9/10/2001	8.54
42	10/10/2001	8.6
43	4/7/1999	8.64
44	5/1/2001	8.67
45	11/2/2000	8.71
46	12/6/2000	8.73
47	2/3/2003	8.81
48	1/22/2002	8.9
49	2/19/2002	8.9
50	3/1/2001	8.95
51	3/1/2001	8.95
52	4/2/2001	9.5

90% = 46.8

Station_ID 2-JKS000.38
 Station_Description RT. 727 IRON GATE Gage: 02016000
 High flow data Jan-may
 Collection_Date Field_pH Temp_Celsuis Collection_Date Field_pH Temp_Celsuis
 1 2/9/95 7.9 1.5 45 3/28/00 7.37 9.5
 2 2/11/87 6.8 3.5 46 3/23/87 7.6 10
 3 1/20/87 6.4 4.2 47 4/13/89 8.8 10
 4 1/4/88 7.9 4.3 48 3/22/90 8.4 10.1
 5 1/4/95 8.5 4.3 49 1/30/91 8.4 10.2
 6 2/10/97 8.13 5.3 50 1/6/97 8.11 10.2
 7 2/9/98 6.94 5.4 51 4/29/87 6.85 11
 8 1/13/99 7.79 5.4 52 5/11/89 8.7 11.1
 9 2/7/94 8 6 53 4/5/94 8 11.3
 10 2/3/92 8 6.1 54 2/28/96 7.97 11.4
 11 1/5/98 7.94 6.2 55 3/26/02 7.52 11.56
 12 3/5/91 7.1 6.4 56 3/3/92 8.2 11.8
 13 2/22/90 8.3 6.6 57 4/8/98 7.84 11.8
 14 1/6/94 8.5 6.6 58 4/19/00 7.33 12
 15 1/16/01 8.43 6.7 59 3/25/03 8.43 12.37
 16 2/1/01 8.48 6.7 60 5/20/96 8.1 12.5
 17 1/18/96 7.7 6.8 61 3/28/89 8.8 13
 18 1/13/00 7.61 7 62 4/4/95 8.76 13.2
 19 1/12/93 7.7 7.1 63 5/2/95 7.61 13.7
 20 2/9/93 8.3 7.1 64 4/7/97 8.41 13.8
 21 1/22/02 8.9 7.1 65 5/21/86 7.3 14.3
 22 2/19/02 8.9 7.2 66 5/12/97 8.32 14.5
 23 3/1/88 8.3 7.3 67 5/5/92 8.2 15.2
 24 3/3/93 8.2 7.3 68 4/7/99 8.64 15.3
 25 2/3/03 8.81 7.3 69 5/23/90 8.1 15.4
 26 3/3/98 8 7.5 70 5/23/02 8.2 15.52
 27 1/23/90 8.8 7.7 71 5/4/88 7.6 15.6
 28 2/5/91 8.3 7.8 72 5/3/94 7.7 15.8
 29 4/2/01 9.5 8.1 73 5/14/98 7.94 16
 30 1/7/92 -- 8.2 74 5/3/99 8.04 16.6
 31 3/3/03 7.93 8.29 75 5/11/87 8.3 17.9
 32 3/27/96 8.09 8.4 76 5/1/03 8.48 18.35
 33 2/8/99 7.7 8.4 77 5/8/91 8.86 18.4 90%
 34 2/24/00 7.7 8.4 78 4/23/90 8.7 18.5
 35 4/7/93 8 8.7 79 4/23/96 7.73 18.8
 36 3/18/99 7.94 8.7 80 5/11/93 7.7 19.3
 37 4/1/91 8.4 8.9 81 5/15/00 8.22 20
 38 3/1/01 8.95 8.9 82 5/1/01 8.67 20.3
 39 3/1/01 8.95 8.9 83 6/21/89 8.1 20.4
 40 2/16/89 8.3 9 84 4/17/02 7.71 20.78
 41 3/1/95 8.07 9.2 85 6/15/88 8.5 24.7
 42 3/12/97 8.28 9.3 76.5 90% data pt 6.4 min pH
 43 4/6/92 8.3 9.4 9.5 max pH
 44 3/8/94 8.1 9.4

APPENDIX C

Permit Development

Dissolved Oxygen Model
2.6 MGD WWTP

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt
"Model Run For C:\Documents and Settings\ljpillis\My Documents\water\Models\stream
model\model runs\lower Jackson\5 segments using Mannings 30BOD 9TKN 6.5 MGD.mod On
2/24/2009 2:18:21 PM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
129.436, 5, 1.1, 5.609, 31

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
2.6, 30, 9, ,6, 31

"Hydraulic Information for Segment 1"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.78, 147.999, 1.927, .716

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
132.036, 5.617, 13.731, .512, 7.344, 31

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.846, 4.993, .25, .583, 0, 0

"Output for Segment 1"
"Segment starts at LOWER JACKSON RIVER WWTP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 5.617, 13.731, .512
.1, .1, 5.554, 13.596, .509
.2, .2, 5.495, 13.462, .506
.3, .3, 5.44, 13.329, .503
.4, .4, 5.388, 13.198, .501
.5, .5, 5.34, 13.068, .499
.6, .6, 5.295, 12.939, .497
.7, .7, 5.253, 12.812, .495
.78, .78, 5.222, 12.711, .493

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
36.2, 2, 0, ,6.611, 31

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.922, 5, 1.1, ,6.611, 31

"Hydraulic Information for Segment 2"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.76, 155.001, 1.775, .689

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
169.158, 5.527, 11.06, .385, 7.346, 31

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.947, 5.124, .25, .583, 0, 0

"Output for Segment 2"
"Segment starts at COWPASTURE RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
.78, 0, 5.527, 11.06, .385
.88, .1, 5.495, 10.947, .383
.98, .2, 5.466, 10.835, .381
1.08, .3, 5.439, 10.724, .379
1.18, .4, 5.414, 10.614, .377
1.28, .5, 5.392, 10.505, .375
1.38, .6, 5.372, 10.397, .373
1.48, .7, 5.354, 10.291, .371
1.54, .76, 5.344, 10.228, .37

"Discharge/Tributary Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5, 2, 0, , 6.612, 31

"Incremental Flow Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 5, 1.1, , 6.614, 31

"Hydraulic Information for Segment 3"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.88, 155.001, 1.778, .613

"Initial Mix Values for Segment 3"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
169.658, 5.348, 10.213, .369, 7.348, 31

"Rate Constants for Segment 3. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.125, 4.056, .25, .583, 0, 0

"Output for Segment 3"
"Segment starts at LICK RUN"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
1.54, 0, 5.348, 10.213, .369
1.64, .1, 5.31, 10.096, .367
1.74, .2, 5.275, 9.98, .365
1.84, .3, 5.243, 9.865, .363
1.94, .4, 5.213, 9.752, .361
2.04, .5, 5.186, 9.64, .359

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

2.14,	.6,	5.161,	9.529,	.357
2.24,	.7,	5.138,	9.419,	.355
2.34,	.8,	5.117,	9.311,	.353
2.44,	.9,	5.099,	9.204,	.351
2.54,	1,	5.082,	9.098,	.349
2.64,	1.1,	5.067,	8.993,	.347
2.74,	1.2,	5.054,	8.89,	.345
2.84,	1.3,	5.043,	8.788,	.343
2.94,	1.4,	5.033,	8.687,	.341
3.04,	1.5,	5.025,	8.587,	.339
3.14,	1.6,	5.018,	8.488,	.337
3.24,	1.7,	5.013,	8.39,	.335
3.34,	1.8,	5.009,	8.294,	.333
3.44,	1.9,	5.006,	8.199,	.331
3.54,	2,	5.005,	8.105,	.329
3.64,	2.1,	5.005,	8.012,	.327
3.74,	2.2,	5.006,	7.92,	.325
3.84,	2.3,	5.008,	7.829,	.323
3.94,	2.4,	5.011,	7.739,	.321
4.04,	2.5,	5.015,	7.65,	.319
4.14,	2.6,	5.019,	7.562,	.317
4.24,	2.7,	5.024,	7.475,	.315
4.34,	2.8,	5.03,	7.389,	.313
4.42,	2.88,	5.035,	7.321,	.312

"Discharge/Tributary Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .02, 30, 15, ,5, 31

"Incremental Flow Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.616, 31

"Hydraulic Information for Segment 4"

"Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 1.1, 160.002, 1.815, .581

"Initial Mix Values for Segment 4"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 169.678, 5.035, 7.329, .318, 7.351, 31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 2.727, 3.54, .25, .583, 0, 0

"Output for Segment 4"

"Segment starts at GLEN WILTON STP"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 4.42, 0, 5.035, 7.329, .318
 4.52, .1, 5.055, 7.265, .316
 4.62, .2, 5.075, 7.202, .314
 4.72, .3, 5.095, 7.139, .312
 4.82, .4, 5.115, 7.077, .31
 4.92, .5, 5.135, 7.016, .308

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt
 5.02, .6, 5.154, 6.955, .306
 5.12, .7, 5.173, 6.895, .304
 5.22, .8, 5.192, 6.835, .302
 5.32, .9, 5.211, 6.776, .3
 5.42, 1, 5.23, 6.717, .298
 5.52, 1.1, 5.249, 6.659, .296

"Discharge/Tributary Input Data for Segment 5"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .24, 2, 0, ,6.617, 31

"Incremental Flow Input Data for Segment 5"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.622, 31

"Hydraulic Information for Segment 5"
 "Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 6.24, 149.998, 1.679, .671

"Initial Mix Values for Segment 5"
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 169.918, 5.251, 6.657, .296, 7.357, 31

"Rate Constants for Segment 5. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 4.038, 5.242, .25, .583, 0, 0

"Output for Segment 5"
 "Segment starts at BIG CREEK"
 "Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 5.52, 0, 5.251, 6.657, .296
 5.62, .1, 5.299, 6.607, .294
 5.72, .2, 5.345, 6.557, .292
 5.82, .3, 5.389, 6.508, .29
 5.92, .4, 5.431, 6.459, .288
 6.02, .5, 5.472, 6.41, .286
 6.12, .6, 5.511, 6.362, .284
 6.22, .7, 5.549, 6.314, .282
 6.32, .8, 5.585, 6.267, .281
 6.42, .9, 5.62, 6.22, .28
 6.52, 1, 5.654, 6.173, .279
 6.62, 1.1, 5.687, 6.127, .278
 6.72, 1.2, 5.718, 6.081, .277
 6.82, 1.3, 5.748, 6.035, .276
 6.92, 1.4, 5.777, 5.99, .275
 7.02, 1.5, 5.805, 5.945, .274
 7.12, 1.6, 5.832, 5.9, .273
 7.22, 1.7, 5.858, 5.856, .272
 7.32, 1.8, 5.884, 5.812, .271
 7.42, 1.9, 5.909, 5.768, .27
 7.52, 2, 5.933, 5.725, .269
 7.62, 2.1, 5.956, 5.682, .268
 7.72, 2.2, 5.978, 5.639, .267
 7.82, 2.3, 6, 5.597, .266

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

7.92,	2.4,	6.021,	5.555,	.265
8.02,	2.5,	6.041,	5.513,	.264
8.12,	2.6,	6.061,	5.472,	.263
8.22,	2.7,	6.08,	5.431,	.262
8.32,	2.8,	6.098,	5.39,	.261
8.42,	2.9,	6.116,	5.349,	.26
8.52,	3,	6.133,	5.309,	.259
8.62,	3.1,	6.15,	5.269,	.258
8.72,	3.2,	6.166,	5.229,	.257
8.82,	3.3,	6.182,	5.19,	.256
8.92,	3.4,	6.197,	5.151,	.255
9.02,	3.5,	6.212,	5.112,	.254
9.12,	3.6,	6.227,	5.074,	.253
9.22,	3.7,	6.241,	5.036,	.252
9.32,	3.8,	6.255,	5,	.251
9.42,	3.9,	6.305,	5,	.25
9.52,	4,	6.353,	5,	.249
9.62,	4.1,	6.399,	5,	.248
9.72,	4.2,	6.442,	5,	.247
9.82,	4.3,	6.483,	5,	.246
9.92,	4.4,	6.522,	5,	.245
10.02,	4.5,	6.56,	5,	.244
10.12,	4.6,	6.596,	5,	.243
10.22,	4.7,	6.622,	5,	.242
10.32,	4.8,	6.622,	5,	.241
10.42,	4.9,	6.622,	5,	.24
10.52,	5,	6.622,	5,	.239
10.62,	5.1,	6.622,	5,	.238
10.72,	5.2,	6.622,	5,	.237
10.82,	5.3,	6.622,	5,	.236
10.92,	5.4,	6.622,	5,	.235
11.02,	5.5,	6.622,	5,	.234
11.12,	5.6,	6.622,	5,	.233
11.22,	5.7,	6.622,	5,	.232
11.32,	5.8,	6.622,	5,	.231
11.42,	5.9,	6.622,	5,	.23
11.52,	6,	6.622,	5,	.229
11.62,	6.1,	6.622,	5,	.228
11.72,	6.2,	6.622,	5,	.227
11.76,	6.24,	6.622,	5,	.227

"END OF FILE"

Dissolved Oxygen Model
3.5 MGD WWTP

modout LJR - manning's ok at 26
"Model Run For C:\water\Models\stream model\model runs\lower Jackson\5 segments
using Mannings 26BOD.mod On 4/4/2006 10:16:04 AM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
129.436, 5, 1.1, 5.609, 31

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
3.5, 26, 5, .6, 31

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.78, 147.999, 1.935, .718

"Initial Mix Values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
132.936, 5.62, 13.882, .228, 7.344, 31

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.846, 4.993, .25, .583, 0, 0

"Output for Segment 1"

"Segment starts at LOWER JACKSON RIVER WWTP"

"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 5.62, 13.882, .228
.1, .1, 5.557, 13.746, .227
.2, .2, 5.498, 13.611, .226
.3, .3, 5.443, 13.477, .225
.4, .4, 5.391, 13.345, .224
.5, .5, 5.343, 13.214, .223
.6, .6, 5.298, 13.084, .222
.7, .7, 5.256, 12.955, .221
.78, .78, 5.225, 12.853, .22

"Discharge/Tributary Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
36.2, 2, 0, .6.611, 31

"Incremental Flow Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.922, 5, 1.1, .6.611, 31

"Hydraulic Information for Segment 2"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.76, 155.001, 1.78, .69

modout LJR - manning's ok at 26
"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
170.058, 5.528, 11.179, .172, 7.346, 31

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.947, 5.124, .25, .583, 0, 0

"Output for Segment 2"

"Segment starts at COWPASTURE RIVER"

"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
.78, 0, 5.528, 11.179, .172
.88, .1, 5.496, 11.065, .171
.98, .2, 5.467, 10.952, .17
1.08, .3, 5.44, 10.84, .169
1.18, .4, 5.415, 10.729, .168
1.28, .5, 5.393, 10.619, .167
1.38, .6, 5.373, 10.51, .166
1.48, .7, 5.355, 10.403, .165
1.54, .76, 5.345, 10.339, .164

"Discharge/Tributary Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5, 2, 0, 6.612, 31

"Incremental Flow Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 5, 1.1, 6.614, 31

"Hydraulic Information for Segment 3"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.88, 155.001, 1.784, .615

"Initial Mix Values for Segment 3"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
170.558, 5.349, 10.323, .164, 7.348, 31

"Rate Constants for Segment 3. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.125, 4.056, .25, .583, 0, 0

"Output for Segment 3"

"Segment starts at LICK RUN"

"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
1.54, 0, 5.349, 10.323, .164
1.64, .1, 5.311, 10.205, .163
1.74, .2, 5.276, 10.088, .162
1.84, .3, 5.244, 9.972, .161
1.94, .4, 5.214, 9.858, .16
2.04, .5, 5.187, 9.745, .159
2.14, .6, 5.162, 9.633, .158

modout LJR - mannings ok at 26

2.24,	.7,	5.139,	9.523,	.157
2.34,	.8,	5.118,	9.414,	.156
2.44,	.9,	5.099,	9.306,	.155
2.54,	1,	5.082,	9.199,	.154
2.64,	1.1,	5.067,	9.094,	.153
2.74,	1.2,	5.054,	8.99,	.152
2.84,	1.3,	5.043,	8.887,	.151
2.94,	1.4,	5.033,	8.785,	.15
3.04,	1.5,	5.025,	8.684,	.149
3.14,	1.6,	5.018,	8.584,	.148
3.24,	1.7,	5.013,	8.486,	.147
3.34,	1.8,	5.009,	8.389,	.146
3.44,	1.9,	5.006,	8.293,	.145
3.54,	2,	5.005,	8.198,	.144
3.64,	2.1,	5.005,	8.104,	.143
3.74,	2.2,	5.006,	8.011,	.142
3.84,	2.3,	5.008,	7.919,	.141
3.94,	2.4,	5.011,	7.828,	.14
4.04,	2.5,	5.015,	7.738,	.139
4.14,	2.6,	5.019,	7.649,	.138
4.24,	2.7,	5.024,	7.561,	.137
4.34,	2.8,	5.03,	7.474,	.136
4.42,	2.88,	5.035,	7.405,	.135

"Discharge/Tributary Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .02, 30, 15, ,5, 31

"Incremental Flow Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.616, 31

"Hydraulic Information for Segment 4"

"Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 1.1, 160.003, 1.821, .582

"Initial Mix Values for Segment 4"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 170.578, 5.035, 7.413, .141, 7.351, 31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 2.727, 3.54, .25, .583, 0, 0

"Output for Segment 4"

"Segment starts at GLEN WILTON STP"

"Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 4.42, 0, 5.035, 7.413, .141
 4.52, .1, 5.056, 7.349, .14
 4.62, .2, 5.076, 7.285, .139
 4.72, .3, 5.096, 7.222, .138
 4.82, .4, 5.116, 7.159, .137
 4.92, .5, 5.136, 7.097, .136
 5.02, .6, 5.156, 7.036, .135

modout LJR - manning's ok at 26

5.12,	.7,	5.175,	6.975,	.134
5.22,	.8,	5.194,	6.915,	.133
5.32,	.9,	5.213,	6.855,	.132
5.42,	1,	5.232,	6.796,	.131
5.52,	1.1,	5.251,	6.737,	.13

"Discharge/Tributary Input Data for Segment 5"

"Flow",	"CBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.24,	2,	0,	,6.617,	31

"Incremental Flow Input Data for Segment 5"

"Flow",	"CBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.622,	31

"Hydraulic Information for Segment 5"

"Length",	"Width",	"Depth",	"Velocity"	
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"	
6.24,	149.998,	1.685,	.673	

"Initial Mix values for Segment 5"

"Flow",	"DO",	"CBOD",	"nBOD",	"dosat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.818,	5.253,	6.735,	.13,	7.357,	31

"Rate Constants for Segment 5. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.829,	4.038,	5.242,	.25,	.583,	0,	0

"Output for Segment 5"
"Segment starts at BIG CREEK"

"Total",	"Segm."				
"Dist.",	"Dist.",	"DO",	"CBOD",	"nBOD"	
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"	
5.52,	0,	5.253,	6.735,	.13	
5.62,	.1,	5.301,	6.685,	.129	
5.72,	.2,	5.347,	6.635,	.128	
5.82,	.3,	5.391,	6.585,	.127	
5.92,	.4,	5.434,	6.536,	.126	
6.02,	.5,	5.475,	6.487,	.125	
6.12,	.6,	5.514,	6.438,	.124	
6.22,	.7,	5.552,	6.39,	.123	
6.32,	.8,	5.589,	6.342,	.122	
6.42,	.9,	5.624,	6.294,	.121	
6.52,	1,	5.658,	6.247,	.12	
6.62,	1.1,	5.691,	6.2,	.119	
6.72,	1.2,	5.722,	6.154,	.118	
6.82,	1.3,	5.752,	6.108,	.117	
6.92,	1.4,	5.781,	6.062,	.116	
7.02,	1.5,	5.809,	6.017,	.115	
7.12,	1.6,	5.836,	5.972,	.114	
7.22,	1.7,	5.862,	5.927,	.113	
7.32,	1.8,	5.888,	5.883,	.112	
7.42,	1.9,	5.913,	5.839,	.111	
7.52,	2,	5.937,	5.795,	.11	
7.62,	2.1,	5.96,	5.752,	.109	
7.72,	2.2,	5.982,	5.709,	.108	
7.82,	2.3,	6.004,	5.666,	.107	
7.92,	2.4,	6.025,	5.624,	.106	

modout LJR - mannings ok at 26

8.02,	2.5,	6.045,	5.582,	.105
8.12,	2.6,	6.065,	5.54,	.104
8.22,	2.7,	6.084,	5.498,	.103
8.32,	2.8,	6.102,	5.457,	.102
8.42,	2.9,	6.12,	5.416,	.101
8.52,	3,	6.137,	5.375,	.1
8.62,	3.1,	6.154,	5.335,	.099
8.72,	3.2,	6.17,	5.295,	.098
8.82,	3.3,	6.186,	5.255,	.097
8.92,	3.4,	6.201,	5.216,	.096
9.02,	3.5,	6.216,	5.177,	.095
9.12,	3.6,	6.231,	5.138,	.094
9.22,	3.7,	6.245,	5.099,	.094
9.32,	3.8,	6.259,	5.061,	.094
9.42,	3.9,	6.273,	5.023,	.094
9.52,	4,	6.286,	5,	.094
9.62,	4.1,	6.335,	5,	.094
9.72,	4.2,	6.382,	5,	.094
9.82,	4.3,	6.427,	5,	.094
9.92,	4.4,	6.47,	5,	.094
10.02,	4.5,	6.511,	5,	.094
10.12,	4.6,	6.55,	5,	.094
10.22,	4.7,	6.587,	5,	.094
10.32,	4.8,	6.622,	5,	.094
10.42,	4.9,	6.622,	5,	.094
10.52,	5,	6.622,	5,	.094
10.62,	5.1,	6.622,	5,	.094
10.72,	5.2,	6.622,	5,	.094
10.82,	5.3,	6.622,	5,	.094
10.92,	5.4,	6.622,	5,	.094
11.02,	5.5,	6.622,	5,	.094
11.12,	5.6,	6.622,	5,	.094
11.22,	5.7,	6.622,	5,	.094
11.32,	5.8,	6.622,	5,	.094
11.42,	5.9,	6.622,	5,	.094
11.52,	6,	6.622,	5,	.094
11.62,	6.1,	6.622,	5,	.094
11.72,	6.2,	6.622,	5,	.094
11.76,	6.24,	6.622,	5,	.094

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JACKSON - JAMES RIVER.**

File Information

File Name: C:\water\Models\stream model\model runs\lower Jackson\5 segments using
Date Modified: April 04, 2006

Water Quality Standards Information

Stream Name: JACKSON - JAMES RIVER
River Basin: James River Basin
Section: 12
Class: IV - Mountainous Zones Waters
Special Standards: none

Background Flow Information

Gauge Used: James River at Lick Run
Gauge Drainage Area: 1373 Sq.Mi.
Gauge 7Q10 Flow: 168.7 MGD
Headwater Drainage Area: 904.5 Sq.Mi.
Headwater 7Q10 Flow: 129.436 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 18.3 MGD
Incremental Flow in Segments: 0.1228696 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 31 Degrees C
Background cBOD5: 5 mg/l
Background TKN: 1.1 mg/l
Background D.O.: 5.609402 mg/l

Model Segmentation

Number of Segments: 5
Model Start Elevation: 995 ft above MSL
Model End Elevation: 923 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JACKSON - JAMES RIVER.**

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.
Discharge Name: LOWER JACKSON RIVER WWTP
VPDES Permit No.:

Discharger Flow Information

Flow: 3.5 MGD
cBOD5: 26 mg/l
TKN: 5 mg/l
D.O.: 6 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 0.78 miles
Upstream Drainage Area: 904.5 Sq.Mi.
Downstream Drainage Area: 912 Sq.Mi.
Upstream Elevation: 995 Ft.
Downstream Elevation: 990 Ft.

Hydraulic Information

Segment Width: 147.999 Ft.
Segment Depth: 1.935 Ft.
Segment Velocity: 0.718 Ft./Sec.
Segment Flow: 132.936 MGD
Incremental Flow: 0.922 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JACKSON - JAMES RIVER.**

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: COWPASTURE RIVER

Tributary Flow Information

Flow: 36.2 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.611 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 0.76 miles
Upstream Drainage Area: 1373 Sq.Mi.
Downstream Drainage Area: 1373 Sq.Mi.
Upstream Elevation: 990 Ft.
Downstream Elevation: 985 Ft.

Hydraulic Information

Segment Width: 155.001 Ft.
Segment Depth: 1.78 Ft.
Segment Velocity: 0.69 Ft./Sec.
Segment Flow: 169.136 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition: A tributary enters.
Tributary Name: LICK RUN

Tributary Flow Information

Flow: 0.5 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.612 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 2.88 miles
Upstream Drainage Area: 1377 Sq.Mi.
Downstream Drainage Area: 1377 Sq.Mi.
Upstream Elevation: 985 Ft.
Downstream Elevation: 970 Ft.

Hydraulic Information

Segment Width: 155.001 Ft.
Segment Depth: 1.784 Ft.
Segment Velocity: 0.615 Ft./Sec.
Segment Flow: 169.636 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 4

Definition Information

Segment Definition: A discharge enters.
Discharge Name: GLEN WILTON STP
VPDES Permit No.:

Discharger Flow Information

Flow: 0.02 MGD
cBOD5: 30 mg/l
TKN: 15 mg/l
D.O.: 5 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 1.1 miles
Upstream Drainage Area: 1378 Sq.Mi.
Downstream Drainage Area: 1378 Sq.Mi.
Upstream Elevation: 970 Ft.
Downstream Elevation: 965 Ft.

Hydraulic Information

Segment Width: 160.003 Ft.
Segment Depth: 1.821 Ft.
Segment Velocity: 0.582 Ft./Sec.
Segment Flow: 169.656 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: Only On Edges

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 5

Definition Information

Segment Definition: A tributary enters.
Tributary Name: BIG CREEK

Tributary Flow Information

Flow: 0.24 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.617 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 6.24 miles
Upstream Drainage Area: 1378 Sq.Mi.
Downstream Drainage Area: 1416 Sq.Mi.
Upstream Elevation: 965 Ft.
Downstream Elevation: 923 Ft.

Hydraulic Information

Segment Width: 149.998 Ft.
Segment Depth: 1.685 Ft.
Segment Velocity: 0.673 Ft./Sec.
Segment Flow: 169.896 MGD
Incremental Flow: 4.669 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: Only On Edges

Table 7-7: Phosphorus Waste Load Allocations - Major Dischargers						
Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Conc. (mg/L)	TP Load Allocation (lbs/growing season)	PO4-P Conc. (mg/L)	PO4-P Load Allocation (lbs/growing season)
MeadWestvaco	VA0003646	35	1.5	66,991	0.21*	9,379
Covington STP	VA0025542	3	0.5	1,914	0.335	1,282
Low Moor WWTP	VA0027979	0.3	1.15	440	0.7705	295
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659	0.335	1,111
Total			71,004	-	12,068	

*Measured as filtered orthophosphorus

Table 7-8: Total Nitrogen Waste Load Allocations During the Growing Season Major Dischargers				
Facility Name	VPDES Permit	Discharge Flow (MGD)	TN Conc. (mg/L)	TN Load (lbs/growing season)
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
Total			213,478	

The allocation for Low Moor WWTP and Lower Jackson River WWTP reflect the aggregated mass load nutrient given to Alleghany County pursuant to 9VAC 25-820-70, Part 1.B.2, otherwise referred to as a "bubble". Accordingly, compliance is determined solely on an aggregate basis rather than by comparison of individual facility waste load allocations.

In addition to the major dischargers, there are 9 active minor facilities holding active individual discharge permits in the Jackson River watershed (4 industrial facilities and 5 municipal facilities). The 4 minor industrial facilities discharge very low level of nutrients. Based on DMR data for a few industrial facilities, the average discharge TP is approximated at 0.34 mg/L and 0.14 mg/l for total nitrogen and total phosphorus, respectively. **Table 7-9** presents the WLAs for the 4 minor industrial facilities for total phosphorus and total nitrogen respectively.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP

Permit No.: VA0090671

Receiving Stream: Jackson

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO ₃) =	136 mg/L	1Q10 (Annual) =	119 MGD	Annual - 1Q10 Mix =	20.37 %	Mean Hardness (as CaCO ₃) =	106 mg/L
90% Temperature (Annual) =	24 deg C	7Q10 (Annual) =	129 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	24.2 deg C
90% Temperature (Wet season) =	18.4 deg C	30Q10 (Annual) =	141 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	12.6 deg C
90% Maximum pH =	8.73 SU	1Q10 (Wet season) =	154 MGD	Wet Season - 1Q10 Mix =	20.37 %	90% Maximum pH =	7.3 SU
10% Maximum pH =	6.4 SU	30Q10 (Wet season) =	182 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6 SU
Tier Designation (1 or 2) =	1	30Q5 =	156 MGD			Discharge Flow =	2.6 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	353 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	6.0E+04	--	--	--	--	--	--	--	--	--	--	na	6.0E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	5.7E+02	--	--	--	--	--	--	--	--	--	--	na	5.7E+02
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	3.1E+01	--	na	6.8E-02	--	--	--	--	--	--	--	--	3.1E+01	--	na	6.8E-02
Ammonia-N (mg/l) (Yearly)	0	3.94E+00	5.31E-01	na	--	4.07E+01	2.93E+01	na	--	--	--	--	--	--	--	--	--	4.07E+01	2.93E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	3.44E+00	7.26E-01	na	--	4.49E+01	5.16E+01	na	--	--	--	--	--	--	--	--	--	4.49E+01	5.16E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.4E+06	--	--	--	--	--	--	--	--	--	--	na	2.4E+06
Antimony	0	--	--	na	6.4E+02	--	--	na	3.9E+04	--	--	--	--	--	--	--	--	--	--	na	3.9E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	3.5E+03	7.6E+03	na	--	--	--	--	--	--	--	--	--	3.5E+03	7.6E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	--	--	na	7.0E+04
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	2.7E-01	--	--	--	--	--	--	--	--	--	--	na	2.7E-01
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	7.2E+02	--	--	--	--	--	--	--	--	--	--	na	7.2E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	4.0E+06	--	--	--	--	--	--	--	--	--	--	na	4.0E+06
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	--	--	na	1.9E+05
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
Cadmium	0	5.4E+00	1.4E+00	na	--	5.6E+01	7.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	7.3E+01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+01	2.2E-01	na	1.1E+00	--	--	--	--	--	--	--	--	2.5E+01	2.2E-01	na	1.1E+00
Chloride	0	8.6E+05	2.3E+05	na	--	8.9E+06	1.2E+07	na	--	--	--	--	--	--	--	--	--	8.9E+06	1.2E+07	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.0E+02	5.6E+02	na	--	--	--	--	--	--	--	--	--	2.0E+02	5.6E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	--	--	--	--	--	--	--	--	na	9.8E+04

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	--	na	1.3E+02	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04
Chloroform	0	--	--	--	na	1.1E+04	--	--	na	6.7E+05	--	--	--	--	--	--	--	--	--	--	na	6.7E+05
2-Chloronaphthalene	0	--	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	--	--	--	--	--	--	--	--	na	9.8E+04
2-Chlorophenol	0	--	--	--	na	1.5E+02	--	--	na	9.2E+03	--	--	--	--	--	--	--	--	--	--	na	9.2E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.6E-01	2.1E+00	na	--	--	--	--	--	--	--	--	--	8.6E-01	2.1E+00	na	--	
Chromium III	0	7.2E+02	9.5E+01	na	--	7.4E+03	4.8E+03	na	--	--	--	--	--	--	--	--	--	7.4E+03	4.8E+03	na	--	
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.7E+02	5.6E+02	na	--	--	--	--	--	--	--	--	--	1.7E+02	5.6E+02	na	--	
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^c	0	--	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Copper	0	1.8E+01	1.2E+01	na	--	1.8E+02	5.9E+02	na	--	--	--	--	--	--	--	--	--	1.8E+02	5.9E+02	na	--	
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.3E+02	2.6E+02	na	9.8E+05	--	--	--	--	--	--	--	--	2.3E+02	2.6E+02	na	9.8E+05	
DDD ^c	0	--	--	na	3.1E-03	--	--	na	4.2E-01	--	--	--	--	--	--	--	--	--	--	na	4.2E-01	
DDE ^c	0	--	--	na	2.2E-03	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01	
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+01	5.1E-02	na	3.0E-01	--	--	--	--	--	--	--	--	1.1E+01	5.1E-02	na	3.0E-01	
Demeton	0	--	1.0E-01	na	--	--	5.1E+00	na	--	--	--	--	--	--	--	--	--	--	5.1E+00	na	--	
Diazinon	0	1.7E-01	1.7E-01	na	--	1.8E+00	8.6E+00	na	--	--	--	--	--	--	--	--	--	1.8E+00	8.6E+00	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01	
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	7.9E+04	--	--	--	--	--	--	--	--	--	--	na	7.9E+04	
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	5.9E+04	--	--	--	--	--	--	--	--	--	--	na	5.9E+04	
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04	
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	3.8E+01	--	--	--	--	--	--	--	--	--	--	na	3.8E+01	
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	2.3E+04	
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	5.1E+04	--	--	--	--	--	--	--	--	--	--	na	5.1E+04	
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	4.3E+05	--	--	--	--	--	--	--	--	--	--	na	4.3E+05	
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	6.1E+05	--	--	--	--	--	--	--	--	--	--	na	6.1E+05	
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04	
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04	
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04	
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E+00	2.8E+00	na	7.4E-02	--	--	--	--	--	--	--	--	2.5E+00	2.8E+00	na	7.4E-02	
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.7E+06	--	--	--	--	--	--	--	--	--	--	na	2.7E+06	
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	5.2E+04	--	--	--	--	--	--	--	--	--	--	na	5.2E+04	
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	6.7E+07	--	--	--	--	--	--	--	--	--	--	na	6.7E+07	
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	na	2.7E+05	
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	--	--	--	--	--	--	--	--	na	3.2E+05	
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04	
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	4.7E+03	--	--	--	--	--	--	--	--	--	--	na	4.7E+03	
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	3.1E-06	--	--	--	--	--	--	--	--	--	--	na	3.1E-06	
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	--	--	--	--	--	--	--	--	2.3E+00	2.8E+00	na	5.4E+03	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	--	--	--	--	--	--	--	--	2.3E+00	2.8E+00	na	5.4E+03	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.3E+00	2.8E+00	--	--	--	--	--	--	--	--	--	--	2.3E+00	2.8E+00	--	--	
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03	
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.9E-01	1.8E+00	na	3.7E+00	--	--	--	--	--	--	--	--	8.9E-01	1.8E+00	na	3.7E+00	
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01	

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	--	na	2.1E+03	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Fluoranthene	0	--	--	--	na	1.4E+02	--	--	na	8.5E+03	--	--	--	--	--	--	--	--	--	--	na	8.5E+03
Fluorene	0	--	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	--	--	--	--	--	--	--	--	na	3.2E+05
Foaming Agents	0	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	--	5.1E-01	na	--	--	--	--	--	--	--	--	--	5.1E-01	na	--	
Heptachlor C	0	5.2E-01	3.8E-03	na	7.9E-04	5.4E+00	1.9E-01	na	1.1E-01	--	--	--	--	--	--	--	--	5.4E+00	1.9E-01	na	1.1E-01	
Heptachlor Epoxide C	0	5.2E-01	3.8E-03	na	3.9E-04	5.4E+00	1.9E-01	na	5.3E-02	--	--	--	--	--	--	--	--	5.4E+00	1.9E-01	na	5.3E-02	
Hexachlorobenzene C	0	--	--	na	2.9E-03	--	--	na	4.0E-01	--	--	--	--	--	--	--	--	--	--	na	4.0E-01	
Hexachlorobutadiene C	0	--	--	na	1.8E+02	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	--	--	na	2.5E+04	
Hexachlorocyclohexane																						
Alpha-BHC C	0	--	--	na	4.9E-02	--	--	na	6.7E+00	--	--	--	--	--	--	--	--	--	--	--	na	6.7E+00
Hexachlorocyclohexane																						
Beta-BHC C	0	--	--	na	1.7E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	--	--	--	na	2.3E+01
Hexachlorocyclohexane																						
Gamma-BHC C (Lindane)	0	9.5E-01	na	na	1.8E+00	9.8E+00	--	na	2.5E+02	--	--	--	--	--	--	--	--	9.8E+00	--	na	2.5E+02	
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	6.7E+04	--	--	--	--	--	--	--	--	--	--	na	6.7E+04	
Hexachloroethane C	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03	
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.0E+02	na	--	--	--	--	--	--	--	--	--	--	1.0E+02	na	--	
Indeno (1,2,3-cd) pyrene C	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01	
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Isophorone C	0	--	--	na	9.6E+03	--	--	na	1.3E+06	--	--	--	--	--	--	--	--	--	--	na	1.3E+06	
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--		
Lead	0	1.7E+02	2.0E+01	na	--	1.8E+03	1.0E+03	na	--	--	--	--	--	--	--	--	--	1.8E+03	1.0E+03	na	--	
Malathion	0	--	1.0E-01	na	--	--	5.1E+00	na	--	--	--	--	--	--	--	--	--	5.1E+00	na	--		
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+01	3.9E+01	--	--	--	--	--	--	--	--	--	--	1.4E+01	3.9E+01	--		
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	9.2E+04	--	--	--	--	--	--	--	--	--	--	na	9.2E+04	
Methylene Chloride C	0	--	--	na	5.9E+03	--	--	na	8.1E+05	--	--	--	--	--	--	--	--	--	--	na	8.1E+05	
Methoxychlor	0	--	3.0E-02	na	--	--	1.5E+00	na	--	--	--	--	--	--	--	--	--	1.5E+00	na	--		
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--		
Nickel	0	2.3E+02	2.6E+01	na	4.6E+03	2.4E+03	1.3E+03	na	2.8E+05	--	--	--	--	--	--	--	--	2.4E+03	1.3E+03	na	2.8E+05	
Nitrate (as N)	0	--	--	na	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--	
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	4.2E+04	--	--	--	--	--	--	--	--	--	--	na	4.2E+04	
N-Nitrosodimethylamine C	0	--	--	na	3.0E+01	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03	
N-Nitrosodiphenylamine C	0	--	--	na	6.0E+01	--	--	na	8.2E+03	--	--	--	--	--	--	--	--	--	--	na	8.2E+03	
N-Nitrosodi-n-propylamine C	0	--	--	na	5.1E+00	--	--	na	7.0E+02	--	--	--	--	--	--	--	--	--	--	na	7.0E+02	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+02	3.3E+02	na	--	--	--	--	--	--	--	--	--	2.9E+02	3.3E+02	na	--	
Parathion	0	6.5E-02	1.3E-02	na	--	6.7E-01	6.6E-01	na	--	--	--	--	--	--	--	--	--	6.7E-01	6.6E-01	na	--	
PCB Total C	0	--	1.4E-02	na	6.4E-04	--	7.1E-01	na	8.8E-02	--	--	--	--	--	--	--	--	--	7.1E-01	na	8.8E-02	
Pentachlorophenol C	0	4.5E+00	3.6E+00	na	3.0E+01	4.6E+01	1.8E+02	na	4.1E+03	--	--	--	--	--	--	--	--	4.6E+01	1.8E+02	na	4.1E+03	
Phenol	0	--	--	na	8.6E+05	--	--	na	5.2E+07	--	--	--	--	--	--	--	--	--	--	na	5.2E+07	
Pyrene	0	--	--	na	4.0E+03	--	--	na	2.4E+05	--	--	--	--	--	--	--	--	--	--	na	2.4E+05	
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	2.4E+02	--	--	--	--	--	--	--	--	--	--	na	2.4E+02	
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.1E+02	2.5E+02	na	2.6E+05	--	--	--	--	--	--	--	--	2.1E+02	2.5E+02	na	2.6E+05
Silver	0	5.6E+00	--	na	--	5.8E+01	--	na	--	--	--	--	--	--	--	--	--	5.8E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	5.5E+03	--	--	--	--	--	--	--	--	--	--	na	5.5E+03
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
Thallium	0	--	--	na	4.7E-01	--	--	na	2.9E+01	--	--	--	--	--	--	--	--	--	--	na	2.9E+01
Toluene	0	--	--	na	6.0E+03	--	--	na	3.7E+05	--	--	--	--	--	--	--	--	--	--	na	3.7E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E+00	1.0E-02	na	3.8E-01	--	--	--	--	--	--	--	--	7.5E+00	1.0E-02	na	3.8E-01
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E+00	3.6E+00	na	--	--	--	--	--	--	--	--	--	4.7E+00	3.6E+00	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	4.1E+04	--	--	--	--	--	--	--	--	--	--	na	4.1E+04
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	1.5E+03	7.7E+03	na	1.6E+06	--	--	--	--	--	--	--	--	1.5E+03	7.7E+03	na	1.6E+06

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.9E+04
Arsenic	1.4E+03
Barium	na
Cadmium	2.2E+01
Chromium III	2.9E+03
Chromium VI	6.6E+01
Copper	7.3E+01
Iron	na
Lead	6.0E+02
Manganese	na
Mercury	5.8E+00
Nickel	8.0E+02
Selenium	8.3E+01
Silver	2.3E+01
Zinc	6.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

6/15/2011 7:59:16 AM

Facility = Lower Jackson 2.6 MGD

Chemical = Ammonia

Chronic averaging period = 30

WLAA = 40.7

WLAC = 29.3

Q.L. = .2

samples/mo. = 4

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average= 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP

Permit No.: VA0090671

Receiving Stream: Jackson

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO ₃) =	136 mg/L	1Q10 (Annual) =	119 MGD	Annual - 1Q10 Mix =	20.51 %	Mean Hardness (as CaCO ₃) =	106 mg/L
90% Temperature (Annual) =	24 deg C	7Q10 (Annual) =	129 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	24.2 deg C
90% Temperature (Wet season) =	18.4 deg C	30Q10 (Annual) =	141 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	12.6 deg C
90% Maximum pH =	8.73 SU	1Q10 (Wet season) =	154 MGD	Wet Season - 1Q10 Mix =	20.51 %	90% Maximum pH =	7.3 SU
10% Maximum pH =	6.4 SU	30Q10 (Wet season) =	182 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6 SU
Tier Designation (1 or 2) =	1	30Q5 =	156 MGD			Discharge Flow =	3.5 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	353 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	4.5E+04	--	--	--	--	--	--	--	--	--	--	na	4.5E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	2.5E+02	--	--	--	--	--	--	--	--	--	--	na	2.5E+02
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	2.4E+01	--	na	5.1E-02	--	--	--	--	--	--	--	--	2.4E+01	--	na	5.1E-02
Ammonia-N (mg/l) (Yearly)	0	4.63E+00	5.73E-01	na	--	3.69E+01	2.36E+01	na	--	--	--	--	--	--	--	--	--	3.69E+01	2.36E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	4.01E+00	7.75E-01	na	--	4.02E+01	4.11E+01	na	--	--	--	--	--	--	--	--	--	4.02E+01	4.11E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.8E+06	--	--	--	--	--	--	--	--	--	--	na	1.8E+06
Antimony	0	--	--	na	6.4E+02	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	2.7E+03	5.7E+03	na	--	--	--	--	--	--	--	--	--	2.7E+03	5.7E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	5.2E+04	--	--	--	--	--	--	--	--	--	--	na	5.2E+04
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	2.0E-01	--	--	--	--	--	--	--	--	--	--	na	2.0E-01
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	na	5.4E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.0E+06	--	--	--	--	--	--	--	--	--	--	na	3.0E+06
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	8.7E+04	--	--	--	--	--	--	--	--	--	--	na	8.7E+04
Cadmium	0	5.4E+00	1.4E+00	na	--	4.3E+01	5.4E+01	na	--	--	--	--	--	--	--	--	--	4.3E+01	5.4E+01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	1.9E+01	1.6E-01	na	8.3E-01	--	--	--	--	--	--	--	--	1.9E+01	1.6E-01	na	8.3E-01
Chloride	0	8.6E+05	2.3E+05	na	--	6.9E+06	8.7E+06	na	--	--	--	--	--	--	--	--	--	6.9E+06	8.7E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.5E+02	4.2E+02	na	--	--	--	--	--	--	--	--	--	1.5E+02	4.2E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	--	--	--	--	--	--	--	--	na	7.3E+04

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	--	na	1.3E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
Chloroform	0	--	--	--	na	1.1E+04	--	--	na	5.0E+05	--	--	--	--	--	--	--	--	--	--	na	5.0E+05
2-Chloronaphthalene	0	--	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	--	--	--	--	--	--	--	--	na	7.3E+04
2-Chlorophenol	0	--	--	--	na	1.5E+02	--	--	na	6.8E+03	--	--	--	--	--	--	--	--	--	--	na	6.8E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	6.6E-01	1.6E+00	na	--	--	--	--	--	--	--	--	--	6.6E-01	1.6E+00	na	--	--
Chromium III	0	7.2E+02	9.5E+01	na	--	5.7E+03	3.6E+03	na	--	--	--	--	--	--	--	--	--	5.7E+03	3.6E+03	na	--	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.3E+02	4.2E+02	na	--	--	--	--	--	--	--	--	--	1.3E+02	4.2E+02	na	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^c	0	--	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	--	--	--	--	--	--	--	--	na	1.8E+00
Copper	0	1.7E+01	1.2E+01	na	--	1.4E+02	4.4E+02	na	--	--	--	--	--	--	--	--	--	1.4E+02	4.4E+02	na	--	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.8E+02	2.0E+02	na	7.3E+05	--	--	--	--	--	--	--	--	1.8E+02	2.0E+02	na	7.3E+05	
DDD ^c	0	--	--	--	na	3.1E-03	--	--	na	3.2E-01	--	--	--	--	--	--	--	--	--	--	na	3.2E-01
DDE ^c	0	--	--	--	na	2.2E-03	--	--	na	2.2E-01	--	--	--	--	--	--	--	--	--	--	na	2.2E-01
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	8.8E+00	3.8E-02	na	2.2E-01	--	--	--	--	--	--	--	--	8.8E+00	3.8E-02	na	2.2E-01	
Demeton	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	--	--	--	--	--	--	--	--	3.8E+00	na	--	
Diazinon	0	1.7E-01	1.7E-01	na	--	1.4E+00	6.4E+00	na	--	--	--	--	--	--	--	--	--	1.4E+00	6.4E+00	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
1,2-Dichlorobenzene	0	--	--	--	na	1.3E+03	--	--	na	5.9E+04	--	--	--	--	--	--	--	--	--	--	na	5.9E+04
1,3-Dichlorobenzene	0	--	--	--	na	9.6E+02	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	4.4E+04
1,4-Dichlorobenzene	0	--	--	--	na	1.9E+02	--	--	na	8.7E+03	--	--	--	--	--	--	--	--	--	--	na	8.7E+03
3,3-Dichlorobenzidine ^c	0	--	--	--	na	2.8E-01	--	--	na	2.9E+01	--	--	--	--	--	--	--	--	--	--	na	2.9E+01
Dichlorobromomethane ^c	0	--	--	--	na	1.7E+02	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-Dichloroethane ^c	0	--	--	--	na	3.7E+02	--	--	na	3.8E+04	--	--	--	--	--	--	--	--	--	--	na	3.8E+04
1,1-Dichloroethylene	0	--	--	--	na	7.1E+03	--	--	na	3.2E+05	--	--	--	--	--	--	--	--	--	--	na	3.2E+05
1,2-trans-dichloroethylene	0	--	--	--	na	1.0E+04	--	--	na	4.6E+05	--	--	--	--	--	--	--	--	--	--	na	4.6E+05
2,4-Dichlorophenol	0	--	--	--	na	2.9E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	--	na	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^c	0	--	--	--	na	1.5E+02	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
1,3-Dichloropropene ^c	0	--	--	--	na	2.1E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	1.9E+00	2.1E+00	na	5.5E-02	--	--	--	--	--	--	--	--	1.9E+00	2.1E+00	na	5.5E-02	
Diethyl Phthalate	0	--	--	--	na	4.4E+04	--	--	na	2.0E+06	--	--	--	--	--	--	--	--	--	--	na	2.0E+06
2,4-Dimethylphenol	0	--	--	--	na	8.5E+02	--	--	na	3.9E+04	--	--	--	--	--	--	--	--	--	--	na	3.9E+04
Dimethyl Phthalate	0	--	--	--	na	1.1E+06	--	--	na	5.0E+07	--	--	--	--	--	--	--	--	--	--	na	5.0E+07
Di-n-Butyl Phthalate	0	--	--	--	na	4.5E+03	--	--	na	2.1E+05	--	--	--	--	--	--	--	--	--	--	na	2.1E+05
2,4 Dinitrophenol	0	--	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	--	--	--	--	--	--	--	--	na	2.4E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	--	na	2.8E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
2,4-Dinitrotoluene ^c	0	--	--	--	na	3.4E+01	--	--	na	3.5E+03	--	--	--	--	--	--	--	--	--	--	na	3.5E+03
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	--	na	5.1E-08	--	--	na	2.3E-06	--	--	--	--	--	--	--	--	--	--	na	2.3E-06
1,2-Diphenylhydrazine ^c	0	--	--	--	na	2.0E+00	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	--	--	na	2.0E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.8E+00	2.1E+00	na	4.1E+03	--	--	--	--	--	--	--	--	1.8E+00	2.1E+00	na	4.1E+03	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.8E+00	2.1E+00	na	4.1E+03	--	--	--	--	--	--	--	--	1.8E+00	2.1E+00	na	4.1E+03	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.8E+00	2.1E+00	--	--	--	--	--	--	--	--	--	--	1.8E+00	2.1E+00	--	--	
Endosulfan Sulfate	0	--	--	--	na	8.9E+01	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	6.9E-01	1.4E+00	na	2.7E+00	--	--	--	--	--	--	--	--	6.9E-01	1.4E+00	na	2.7E+00	
Endrin Aldehyde	0	--	--	--	na	3.0E-01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	--	na	2.1E+03	--	--	na	9.6E+04	--	--	--	--	--	--	--	--	--	--	na	9.6E+04
Fluoranthene	0	--	--	--	na	1.4E+02	--	--	na	6.4E+03	--	--	--	--	--	--	--	--	--	--	na	6.4E+03
Fluorene	0	--	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	--	--	--	--	--	--	--	--	na	2.4E+05
Foaming Agents	0	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	--	3.8E-01	na	--	--	--	--	--	--	--	--	--	--	3.8E-01	na	--
Heptachlor ^c	0	5.2E-01	3.8E-03	na	7.9E-04	4.1E+00	1.4E-01	na	8.0E-02	--	--	--	--	--	--	--	--	4.1E+00	1.4E-01	na	8.0E-02	
Heptachlor Epoxide ^c	0	5.2E-01	3.8E-03	na	3.9E-04	4.1E+00	1.4E-01	na	4.0E-02	--	--	--	--	--	--	--	--	4.1E+00	1.4E-01	na	4.0E-02	
Hexachlorobenzene ^c	0	--	--	na	2.9E-03	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01	
Hexachlorobutadiene ^c	0	--	--	na	1.8E+02	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04	
Hexachlorocyclohexane	0	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Alpha-BHC ^c	0	--	--	na	4.9E-02	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Hexachlorocyclohexane	0	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	1.7E+01
Beta-BHC ^c	0	--	--	na	1.7E-01	--	--	na	1.7E+01	--	--	--	--	--	--	--	--	--	--	--	na	1.7E+01
Hexachlorocyclohexane	0	9.5E-01	na	na	1.8E+00	7.6E+00	--	na	1.8E+02	--	--	--	--	--	--	--	--	7.6E+00	--	na	1.8E+02	
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.0E+04	--	--	--	--	--	--	--	--	--	--	na	5.0E+04	
Hexachloroethane ^c	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	--	--	--	--	--	--	--	--	na	3.4E+03	
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	7.6E+01	na	--	--	--	--	--	--	--	--	--	7.6E+01	na	--	--	
Indeno (1,2,3-cd) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01	
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Isophorone ^c	0	--	--	na	9.6E+03	--	--	na	9.8E+05	--	--	--	--	--	--	--	--	--	--	na	9.8E+05	
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--	--	
Lead	0	1.7E+02	2.0E+01	na	--	1.4E+03	7.5E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	7.5E+02	na	--	
Malathion	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	--	--	--	--	--	--	--	3.8E+00	na	--	--	
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Mercury	0	1.4E+00	7.7E-01	--	--	1.1E+01	2.9E+01	--	--	--	--	--	--	--	--	--	--	1.1E+01	2.9E+01	--	--	
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	6.8E+04	--	--	--	--	--	--	--	--	--	--	na	6.8E+04	
Methylene Chloride ^c	0	--	--	na	5.9E+03	--	--	na	6.0E+05	--	--	--	--	--	--	--	--	--	--	na	6.0E+05	
Methoxychlor	0	--	3.0E-02	na	--	--	1.1E+00	na	--	--	--	--	--	--	--	--	--	1.1E+00	na	--	--	
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--	--	
Nickel	0	2.3E+02	2.6E+01	na	4.6E+03	1.8E+03	9.9E+02	na	2.1E+05	--	--	--	--	--	--	--	--	1.8E+03	9.9E+02	na	2.1E+05	
Nitrate (as N)	0	--	--	na	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--	
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	--	--	na	3.1E+04	
N-Nitrosodimethylamine ^c	0	--	--	na	3.0E+01	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03	
N-Nitrosodiphenylamine ^c	0	--	--	na	6.0E+01	--	--	na	6.1E+03	--	--	--	--	--	--	--	--	--	--	na	6.1E+03	
N-Nitrosodi-n-propylamine ^c	0	--	--	na	5.1E+00	--	--	na	5.2E+02	--	--	--	--	--	--	--	--	--	--	na	5.2E+02	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.2E+02	2.5E+02	na	--	--	--	--	--	--	--	--	--	2.2E+02	2.5E+02	na	--	
Parathion	0	6.5E-02	1.3E-02	na	--	5.2E-01	4.9E-01	na	--	--	--	--	--	--	--	--	--	5.2E-01	4.9E-01	na	--	
PCB Total ^c	0	--	1.4E-02	na	6.4E-04	--	5.3E-01	na	6.5E-02	--	--	--	--	--	--	--	--	5.3E-01	6.5E-02	na	--	
Pentachlorophenol ^c	0	4.4E+00	3.6E+00	na	3.0E+01	3.5E+01	1.4E+02	na	3.1E+03	--	--	--	--	--	--	--	--	3.5E+01	1.4E+02	na	3.1E+03	
Phenol	0	--	--	na	8.6E+05	--	--	na	3.9E+07	--	--	--	--	--	--	--	--	--	--	na	3.9E+07	
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.8E+05	--	--	--	--	--	--	--	--	--	--	na	1.8E+05	
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02	
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	1.6E+02	1.9E+02	na	1.9E+05	--	--	--	--	--	--	--	--	1.6E+02	1.9E+02	na	1.9E+05
Silver	0	5.6E+00	--	na	--	4.4E+01	--	na	--	--	--	--	--	--	--	--	--	4.4E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	--	--	--	--	--	--	--	--	na	3.4E+03
Thallium	0	--	--	na	4.7E-01	--	--	na	2.1E+01	--	--	--	--	--	--	--	--	--	--	na	2.1E+01
Toluene	0	--	--	na	6.0E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	na	2.7E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	5.8E+00	7.6E-03	na	2.9E-01	--	--	--	--	--	--	--	--	5.8E+00	7.6E-03	na	2.9E-01
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.7E+00	2.7E+00	na	--	--	--	--	--	--	--	--	--	3.7E+00	2.7E+00	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	--	--	na	1.6E+04
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	--	--	na	3.1E+04
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	--	--	--	--	--	--	--	--	na	2.4E+03
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	--	--	--	--	--	--	--	--	na	2.4E+03
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	1.2E+03	5.8E+03	na	1.2E+06	--	--	--	--	--	--	--	--	1.2E+03	5.8E+03	na	1.2E+06

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.9E+04
Arsenic	1.1E+03
Barium	na
Cadmium	1.7E+01
Chromium III	2.2E+03
Chromium VI	5.1E+01
Copper	5.6E+01
Iron	na
Lead	4.5E+02
Manganese	na
Mercury	4.5E+00
Nickel	5.9E+02
Selenium	6.4E+01
Silver	1.8E+01
Zinc	4.7E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

6/15/2011 8:02:02 AM

Facility = Lower Jackson 3.5 MGD

Chemical = Ammonia

Chronic averaging period = 30

WLAA = 36.8

WLAC = 23.6

Q.L. = .2

samples/mo. = 4

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average= 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

	A	B	C	D	E	F	G	H	I	J	K	L	M													
1	Spreadsheet for determination of WET test endpoints or WET limits																									
2																										
3																										
4	Excel 97																									
5	Revision Date: 01/10/05																									
6	File: WETLIM10.xls																									
7	(MIX.EXE required also)																									
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15	Enter data in the cells with blue type:																									
16																										
17	Entry Date:	06/14/11																								
18	Facility Name:	Lower Jackson River																								
19	VPDES Number:	VA0090671																								
20	Outfall Number:	001																								
21																										
22	Plant Flow:	2.6 MGD																								
23	Acute 1Q10:	119 MGD																								
24	Chronic 7Q10:	129 MGD																								
25																										
26	Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)																							
27	Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)																							
28																										
29																										
30	IWC _a	9.67405864 %	Plant flow/plant flow + 1Q10																							
31	IWC _c	1.975683891 %	Plant flow/plant flow + 7Q10																							
32																										
33	Dilution, acute	10.33692308	100/IWC _a																							
34	Dilution, chronic	50.61538462	100/IWC _c																							
35																										
36	WLA _a	3.101076923	Instream criterion (0.3 TU _a) X's Dilution, acute																							
37	WLA _c	50.61538462	Instream criterion (1.0 TU _c) X's Dilution, chronic																							
38	WLA _{a,c}	31.01076923	ACR X's WLA _a - converts acute WLA to chronic units																							
39																										
40	ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)																							
41	CV-Coefficient of variatior	0.6	Default of 0.6 - if data are available, use tables Page 2)																							
42	Constants eA	0.4109447	Default = 0.41																							
43	eB	0.6010373	Default = 0.60																							
44	eC	2.4334175	Default = 2.43																							
45	eD	2.4334175	Default = 2.43 (1 samp)	No. of sample:	1	**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.																				
46	LTA _{a,c}	12.74371126	WLA _{a,c} X's eA																							
47	LTA _c	30.42173411	WLAc X's eB																							
48																										
49	MDL** with LTA _{a,c}	31.01076999	TU _c	NOEC =	3.224686	(Protects from acute/chronic toxicity)																				
50	MDL** with LTA _c	74.02878016	TU _c	NOEC =	1.350826	(Protects from chronic toxicity)																				
51	AML with lowest LTA	31.01076999	TU _c	NOEC =	3.224686	Lowest LTA X's eD																				
52																										
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a																									
54																										
55	MDL with LTA _{a,c}	3.101076999	TU _a	LC50 =	32.246861	%																				
56	MDL with LTA _c	7.402878016	TU _a	LC50 =	13.508260	%																				
57																										
58																										

NOTE: If the IWC_a is >33%, specify the NOAEC = 100% test/endpoint for use

	A	B	C	D	E	F	G	H	I	J	K	L	M	
110	Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)													
111	To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC ₅₀ , since the ACR divides the LC ₅₀ by the NOEC. LC ₅₀ 's >100% should not be used.													
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Table 1. ACR using Vertebrate data

ACR for vertebrate data: 0

Table 2. ACR using Invertebrate data

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Limit % Effluent
Dilution series based on data mean	7.8	12.743711
Dilution series to use for limit		4
Dilution factor to recommend:	0.2801251	0.2
Dilution series to recommend:	100.0	100.0
	28.0	20.0
	7.8	4.0
	2.2	1.2500
	0.62	0.2
Extra dilutions if needed	0.17	3125.00
	0.05	15625.00

Convert LC₅₀'s and NOEC's to C for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC ₅₀	TUc	Enter NOEC
1	NO DATA		
2	NO DATA		
3	NO DATA		
4	NO DATA		
5	NO DATA		
6	NO DATA		
7	NO DATA		
8	NO DATA		
9	NO DATA		
10	NO DATA		
11	NO DATA		
12	NO DATA		
13	NO DATA		
14	NO DATA		
15	NO DATA		
16	NO DATA		
17	NO DATA		
18	NO DATA		
19	NO DATA		
20	NO DATA		

If WLA.EXE determines that an acute limit is needed convert the TUc answer you get to TUa and then an

enter it here: %LC₅₀

NO DATA TUa

APPENDIX D

TMDL Assessment Information

Appendix A - List of Impaired (Category 5) Waters in 2010

James River Basin

Cause Group Code: I09R-01-BEN

Jackson River

Location: Jackson River mainstem from the Westvaco main processing outfall downstream to the confluence of the Jackson and Cowpasture Rivers.

City / County: Alleghany Co. Covington City

Use(s): Aquatic Life

Cause(s) /

VA Category: Benthic-Macroinvertebrate Bioassessments / 5A

The original 1996 VAW-I04R and VAW-I09R impairments were combined into one in 2002.

2010 Benthic Assessment station locations are:

- 2-JKS000.38 - Rt. 727 Bridge - near Iron Gate (I09R)
- 2-JKS006.67 - Low Water Bridge - near Dabney Lancaster CC (I09R)
- 2-JKS013.29 - Off Rt. 696 above Lowmoor (I09R)
- 2-JKS018.68 - Rt. 18 Bridge at Covington (I09R)
- 2-JKS020.41 - Upper Horse Shoe at Rayon Terrace (I09R)
- 2-JKS022.78 - Fudge's Bridge, Rt. 154, Covington (I09R)
- 2-JKS023.61 - City Park - Covington at gage (I09R)

The 1996 originally 303(d) Listed impairments to the benthic community are believed due to nutrient and organic enrichment (deposition) for 24.18 miles. Based on ambient station solids data, the nutrients and organics are mainly dissolved. Trend analysis finds a significant declining trend for total phosphorus. Maxima have been greatly reduced since 1996. These waters remain impaired until completion of the Jackson R. TMDL Study.

General Standard (Benthic):

2-JKS023.61-Bio 'IM' Seven Virginia Stream Condition Index (VSCI) surveys (2003 - 2008) for 2010; lowest score spring 2007 32.92 and highest score 57.38 spring 2004. The spring 2006 score is 34.36. The invertebrate community at this site has been dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tubificidae, Tricladida, Chironomidae, Lumbriculidae and Simuliidae). The VSCI scores display a negative alteration in the taxonomic diversity and pollution sensitivity of the benthic community. Elevated total phosphorus levels continue although maxima are reduced where 6 of 40 samples are above 0.20 mg/l - 'Observed Effect'. The maximum value is 0.40 mg/l and the lowest 0.28 mg/l. Past values above 0.20 have been greater than 1.40 mg/l. The 2008 Integrated Report (IR) assessed seven VSCI surveys (2001 - 2006); lowest score spring 2001 31.03 and highest score 52.38 spring 2004. The spring 2006 score is 34.36. 2008 elevated total phosphorus levels were 17 of 51 samples above 0.20 mg/l - 'Observed Effect'. The maximum value is 1.40 mg/l and the lowest 0.23 mg/l.

2-JKS022.78- 2010 Elevated TP values greater than 0.20 mg/l are found in two of 12 samples with excessive values ranging from 0.28 to 0.39 mg/l.

2-JKS020.41- A 2007 probability station. Bio 'IM' Two VSCI surveys (2007), average score 48.13. The invertebrate community at this site is dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tricladida and Asellidae).

2-JKS018.68- Bio 'IM' Five VSCI surveys (2004, 2006-2008) with a 6 year average score of 54.28. The benthic community shows some improvement at this station relative to the station at City Park (2-JKS023.61). However, the benthic community remains dominated by pollution tolerant taxa. In 2010 two of 16 total phosphorus observations are greater than 0.20 mg/l; excessive values range from 0.22 to 0.3 mg/l. The 2008 assessment reports two VSCI scores from the fall of 2004 (67.3) and 2006 (51.8). 2008 assessment TP results find no elevated TP levels above 0.20 mg/l from nine observations (no additional data). The 2006 IR reported six of 18 observations greater than 0.20 mg/l. Elevated TP values ranged from 0.30 to 0.70 mg/l.

2-JKS013.29- 2010 results find an impaired condition with the lowest at 38.6 fall 2004 and the highest at 61.3 fall 2006 from six VSCI survey scores (2003, 2004, 2006 & 2007). Lower VSCI scores are the result of the low taxonomic diversity and lack of pollution sensitive taxa. The 2008 IR found impairment from

Appendix A - List of Impaired (Category 5) Waters in 2010

James River Basin

four VSCI surveys (2003 - 2004 & 2006). The Low Moor station through the 2008 assessment has consistently had lower assessment scores and higher numbers of pollution tolerant organisms than at 2-JKS018.68. The 2006 sample showed an increase in pollution sensitive taxa and a decrease in pollution tolerant taxa. There are no additional total phosphorous data within the 2010 data window. 2008 elevated TP levels above 0.20 mg/l are found in six of 12 samples with excessive values ranging from 0.29 to 1.41 mg/l- 'Observed Effect'.

The 2008 IR found impairment from four VSCI surveys (2003 - 2004 & 2006). The Low Moor station through the 2008 assessment has consistently had lower assessment scores and higher numbers of pollution tolerant organisms than at 2-JKS018.68.

2-JKS006.67- 2010 results find 'Full Support' from six VSCI surveys (2003-2008) with an average six year score of 61.2. There have been slight differences in scores over the six-year period. Spring scores have been lower than fall scores. Lower VSCI scores are the result of the decrease in pollution sensitive taxa. Recent improvements in the benthic community may be due to a reduction in cooling water discharge and efforts to reduce nutrient discharge to the river. One elevated TP value is found at 0.26 mg/l from six samples within the 2010 data window. Trend analysis at 2-JKS000.38 reports a significant declining trend in total phosphorus. The 2008 IR reports four VSCI surveys (2001-2004) showing overall impairment with an average score of 52.8. Elevated TP concentrations greater than 0.20 mg/l are found in eight of 21 observations ranging from 0.21 to 0.50 mg/l- 'Observed Effect'.

2-JKS000.38- The 2010 assessment finds a single elevated TP observation greater than 0.20 mg/l from 38 observations at 0.22 mg/l. The 2008 assessment reported elevated TP observations greater than 0.20 mg/l in 15 of 50 observations- 'Observed Effect'. Values above 0.20 mg/l range from 0.22 to 1.24 mg/l. Trend analysis reveals significant declining trends in bacteria, total phosphorus and nitrogen.

Jackson River Aquatic Life	Benthic-Macroinvertebrate Bioassessments - Total Impaired Size by Water Type:	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
				24.18

Sources:

Industrial Point Source Discharge Municipal (Urbanized High Density Area) Municipal Point Source Discharges